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ABSTRACT

Adolescents today have to live with incoherence for longer periods than before, and that makes ambiguity tolerance a socially significant personality dimension. Studies of the development of ambiguity tolerance in adolescents are reported. The pilot study, "Adaptation of MAT-50 for Use with Bulgarian Population," involves translation and adaptation of the test for use in Bulgaria. Analysis of the pilot data is discussed. Study 1, "Cross Sectional Analysis of the Development of Ambiguity Tolerance in the Age Interval 15-25 Years," provides insight into the psychometric characteristics of the MAT-50/BG-2 and reports on differences in ambiguity tolerance related to subjects' sex, age, and education. Study 2, "How Ambiguity Tolerant Adolescents Compare with Those Who Are Intolerant of Ambiguity on Different Cognitive and Personality Characteristics," reports on selection of the group of high and low ambiguity tolerant adolescents. Study 3, "How the Attitudes of Teachers and Parents Influence the Development of Ambiguity Tolerance in Adolescents," addresses the differences in ambiguity tolerance related to subjects' sex, age and settlement; differences in AT-AInT values and parents' self-reported AT-AInT encouragement; and relationships between students' ambiguity tolerance and parents' self-reported AInT encouragement. Results and conclusions are discussed with emphasis on the educational implications of ambiguity tolerance. The Parents-Teacher Ambiguity Tolerance Survey is appended. (Contains 23 references and numerous tables and figures.) (EMK)

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AMBIGUITY TOLERANCE: ADOLESCENTS' RESPONSES TO UNCERTAINTY IN LIFE

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Research report

September 1996 - December 1997

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Introduction

Tolerance - intolerance of ambiguity refers to the capacity to withstand the uncertainty, to tolerate the discomfort of an ambiguous situation - a situation containing a great deal of novelty, complexity, contradiction and/or lack of structure. The significance of human abilities to handle ambiguity increases in the present situation of growing technological and cultural diversity and complexity. Adolescence as a stage of human development involves a major expasion in the range and complexity of the personal experience and social life and brings a lot of confusion and changes among both the young and adults, therefore challenging their abilities to deal with uncertainty (Jackson and Rodriguez-Tome, 1993).

Adolescents today have to live with incoherence for longer periods than before and that makes ambiguity tolerance a socially significant personality dimension. This is particularly true for Bulgarian adolescents who suffer mostly from the negative psychological consequences of the dramatic changes in our society during the last five years. Uncertainty is inherent to almost any one situation they are confronted with in their individual and social development and knowing how to cope with influences the way young people approach specific developmental tasks. Being ambiguity tolerant can prevent adolescents from black-and-white solutions and premature reactions to indefinite and/or challenging situations. The personality growth and social integration of young people is facilitated through development of individual's willingness to accommodate or adapt, but not avoid, to encounters with ambiguous situations, events or ideas.

Tolerance - intolerance of ambiguity as a personality trait was originally identified by Frenkel - Brunswick (1949) in the context of research on the authoritarian personality. Tolerance - intolerance of ambiguity is defined as a tendency to perceive or interpret ambiguous situations, events or ideas as source of psychological discomfort or threat (AInT) or as desirable, challenging and interesting (AT). AInT was associated with prejudice and mental rigidity. AT individuals seeks out ambiguity and enjoy it; they have mental flexibility, less rigid defences and more psychological openness, can tolerate the discomfort of an ambiguous situation long enough to find out the appropriate solution and/or interpretation therefore excelling in the performance of ambiguous tasks. Ambiguity tolerance (AT) has been investigated across a wide age range, but almost no age comparisons have been made. The aim of this research project is to study the personality dimension of tolerance of ambiguity from a developmental perspective. Topic of particular interest for us is the age interval of 15 - 25 years.

To the extent that ambiguity tolerance outgrows of the overall psycho-social development of the individual, the formative influences of the social environment should be considered as well. One of the most powerful ways in which a culture encourages or discourages certain behaviour is the way by which teachers and parents reward or punish certain personality characteristics as they develop in children or the behaviours which manifest those characteristics. That is why this research work will also focus on the question whether and to what extent teachers and parents encourage behaviours related to ambiguity tolerance in adolescents.

Thus the research project aims at:

1. Cross -sectional analysis of ambiguity tolerance in the age interval 15 - 25 years
2. To examine how ambiguity tolerant adolescents compare with those who are intolerant of ambiguity on different cognitive and personality characteristics.
3. To assess the influence of teachers' and parents' reward strategies on the development of ambiguity tolerance in adolescents.
4. Adaptation of a personality questionnaire for measuring individual difference in ambiguity tolerance (MAT - 50 of Robert Norton).
5. Construction and approbation of a psychological instrument assessing adults' reward strategies toward ambiguity tolerant - intolerant behaviour in adolescents.

1. PILOT STUDY: ***Adaptation of MAT - 50 for use with Bulgarian population***

September - October 1996

The questionnaire of Robert Norton MAT-50 (Norton, 1975) has been chosen as a measure of individual differences in ambiguity tolerance in this project. Norton defines the construct of ambiguity intolerance as follows: "Intolerance of ambiguity is a tendency to perceive or interpret information marked by vague, incomplete, fragmented, multiple, probable, unstructured, uncertain, inconsistent, contrary, contradictory, or unclear meanings as actual or potential sources of psychological discomfort or threat " (Norton, 1975, 608). MAT - 50 is a paper-and-pencil self-report inventory and consists of 61 items. Each item reflects a potentially ambiguous situation and incorporates some function of tolerance (7 items) or intolerance (54 items) of this situation. The items are drawn from 8 content areas: philosophy, interpersonal communication, public image, job-related, problem-solving, social, habits and art forms. The questionnaire is scored for ambiguity tolerance: the higher score indicates higher ambiguity tolerance.

1.1. Translation and adaptation of MAT - 50 in Bulgarian

Five independent translations of MAT - 50 in Bulgarian were provided by the experts in the project. Then, on a group expert meeting the different translations were read, compared and the final formulation of each item in Bulgarian was agreed upon. At this stage the writing of the items in Bulgarian was guided by the following principles: 1) to keep them as close as possible to the original wording of the author; 2) a smooth, everyday formulation in Bulgarian was looked for that can be understood by an average reader, and 3) a slight change in the content of some of the original items was made to adapt them to the Bulgarian cultural reality. For example, miles have been changed into kilometres. Also, "If I miss the beginning of a good movie, I like to stay to see the start of it" has been transformed to ".....I would like to be able to stay to see the start of it". In Bulgarian cinemas the organisation is different from the American ones: you get a ticket that is valid for one session only and you cannot just stay for the next show of the movie.

In this way the first Bulgarian version of MAT - 50 was produced. It was labelled MAT - 50 / BG - 1.

Five and seven-point rating scales have been used by R. Norton himself with MAT - 50 which ranged from "very strong agreement" to "very strong disagreement". A 4 - point rating scale had been adopted for use with the Bulgarian adaptation of his

questionnaire MAT - 50 / BG - 1, from "it is true " to "it is not true". The choice of this rating scale was based on author's and experts' experience in personality testing within the Bulgarian population. The 4-point rating scale has revealed itself as an appropriate answering format since it is both enough elaborated and contains no meaningless "can't decide " middle point which is usually chosen by subjects who, for whatever reasons, avoid making a real choice out of the available alternatives.

1.2. Pilot testing

In September and October 1996, the MAT - 50 / BG - 1 questionnaire was administered to 472 subjects. The sample is relatively well balanced by sex and age group (Table 1) with university male students been slightly underrepresented. The age of the sample ranges from 14 to 43 with 95% of the subjects being within the age interval 14 - 26 years.

Table 1.1. Distribution of the pilot sample by sex and age group

	Boys	Girls	Total
High school students	113	113	226
University students	91	155	246
Total	204	268	472

The high school subsample was drawn from 4 public schools in Sofia: 95th Secondary School (N=88), 96th Secondary School (N=83), 36th Secondary School (N=39) and National High School in Mathematics and Science (N=16). It includes students from grades 9th (N=58), 10th (N=86), 11th (N=65) and 12th (N=17). They were tested in group sessions within the regular classroom context.

The university subsample was drawn from the University of Sofia (N=100), the National Academy for Theatre and Film Arts - NATFIZ (N=119) and the New Bulgarian University (N=27). It includes students at their first (N=82), second (N=42), third (N=65), fourth (N=39) or fifth (N=20) year of education. They were tested in group sessions (before or after they have had lectures, on the basis of an agreement with the lecturer) or individually (to fill in the questionnaire at home and return it to the psychologist in a appropriate for both of them time).

1.3. Analyses of the pilot data

Item analysis was performed separately for each subgroup: boys, girls, high school pupils and university students. Item reliability was examined on the basis of the following criteria:

- item difficulty, i.e. the proportion of subjects who accept - reject the item;
- the distribution of subjects' answers into the different categories of the rating scale, and
- item correlation with the total score derived from the questionnaire.

Unreliable items, i.e. items that have asymmetrical distribution and/or low correlation with the total score have been reformulated to improve the verbal expression in Bulgarian of their psychological content. Below are given some examples:

1. "Generally, the more meanings a poem has, the better I like it." The item correlates very low, from 0.06 to 0.14, with the total score derived from MAT - 50 / BG - 1 and has marked asymmetric distribution, especially in girls and university students: 78% and 82% respectively disagree with it. Our suggestion was that girls and university students, being personally more involved in poetry, have answered it according to their specific preferences: they like poems they understand in their own and beloved way. To improve the content of the item and, therefore, its distribution, it was changed into: "Generally, the more meanings an art form has, the better I like it."

2. "I get very anxious waiting to hear the election results". The item correlates very low, from 0.08 to 0.14, with the total score derived from MAT - 50 / BG - 1 and has asymmetric distribution: 63% of the boys, 62% of the girls, 62% of high school pupils and 64% of the university students say "it is not true". The specific Bulgarian social and political context may have influenced these results. The high hopes and enthusiasm from the first years of democratic changes in our country were followed by a deepening economic crisis and a very serious drop in the standard of life of the population. As a result, the disappointment and disengagement from the newly adopted democratic procedures is growing in the Bulgarian society, especially among its young generations. To make this item working, we decided to avoid the specific content concerning elections while keeping the worries about the uncertain outcome of something as an indicator of ambiguity intolerance. The item has been changed into: "I get very anxious waiting to hear the results of something very important to me".

3. "Almost every problem has a solution". The item practically has no correlation with the total score (from 0.00 to 0.07) and is considered to be true by 67% to 72% of the subjects in the different subgroups. To improve its psychometric characteristics, the item has been strengthened in its expression: "With no exception every problem has a solution".

All items were reviewed and most of them were reformulated to improve their relevance to the underlying psychological constructs. At this stage the writing of the items was guided by the following principles: 1) to structure their content as close as possible to the author's definition of intolerance of ambiguity; in several cases this implied some departure of the Bulgarian formulation from the original wording of the item; 2) to make the item a more or less salient expression of a symptom in order to improve the distribution of subjects' answers alongside the rating scale. Some of the items were rearranged to eliminate possible interference in subjects' answers to neighbouring items; and 3) to achieve a formulation that will make the item equally acceptable for boys and girls, for younger and older adolescents.

Thus an improved version of MAT - 50 for use with the Bulgarian population was created . It was labelled MAT - 50 / BG - 2. MAT-50 / BG - 2 was used in the further implementation of this research project.

2. STUDY ONE: *Cross sectional analysis of the development of ambiguity tolerance in the age interval 15 - 25 years*

November 1996 - March 1997

In November and December 1996, MAT-50 / BG-2 was administered to 935 high school pupils, university students and working adolescents (Table 2.1). The age of the subjects varies from 14 to 28 with a mean of 19.14 and standard deviation of 3.06. Of them, 97 % are 15 - 25 years old.

Table 2.1. Distribution of the sample by sex and descriptive statistics for age of the groups of subjects

Sample	High school students	University students	Working adolescents	Total
Boys	155	221	64	440
Girls	237	206	52	495
Total	392	427	116	935
Age	14 - 18 M = 16.2 SD = 0.98	17 - 28 M = 21.05 SD = 2.02	18 - 26 M = 22.10 SD = 2.43	14 - 28 M = 19.14 SD = 3.06

The high school subsample (Table 2.2.) was drawn from two secondary schools in Sofia: 127th Secondary school (N=128) and Language School No 33 (N=127) and from Secondary School "Hristo Botev" in the town of Nova Zagora in the southern eastern part of Bulgaria (N=137). The sample is balanced by sex and age groups with male students being slightly underrepresented. Students were tested in group sessions within the regular classroom context. The age of the students varies from 14 to 18 with a mean of 16.2 and standard deviation of 0.98. The mean age of the students in the different grades is as follows: 9th grade - 15.2 (0.65); 10th grade - 16.2 (0.66); 11th grade - 17.04 (0.64).

Table 2.2. Distribution by sex and age of the high school subsample

	9th grade	10th grade	11th grade	Total
Boys	48	53	54	155
Girls	69	84	84	237
Total	117	137	138	392

The university subsample (Table 2.3.) was drawn from 4 higher education institutions in Sofia: National Academy for Theatre and Film Arts (students in acting who have not been involved in the pilot study) - N = 108; University of Sofia (students in Bulgarian philology and in History who have not been involved in the pilot study) - N = 35; Medical University - N=118; Technical University - N=166. It is very well balanced by sex and age groups. Students were tested in group sessions (before or after they have had lectures, on the basis of an agreement with the lecturer) or individually (to fill in the questionnaire at home and return it to the psychologist in a appropriate for both of them time). The age range of the sample is from 17 to 27 with a mean of 21.05 and standard deviation of 2.02. The mean age of the students of the different years of education varies as follows: 1st year = 19.4 (1.54); 2nd year = 20.2 (1.41); 3rd year = 21.7 (1.59); 4th year = 22.8 (1.57).

Table 2.3. Distribution by sex and age of the university subsample

	1st year	2nd year	3rd year	4th year	Total
Boys	50	55	52	64	221
Girls	55	51	50	50	206
Total	105	106	102	114	427

The subsample of working adolescents was gathered in Sofia. It includes individuals who have no university degree and actually do not study at a university level. Subjects were given the test individually to be fill in at home and returned to the psychologist in an appropriate for both of them time. The age of the subjects in this group varies from 18 to 26 with a mean of 22.10 and standard deviation of 2.43. Boys (M=22.2; SD=2.48, N=64) and girls (M=21.9; SD=2.38, N=52) do not differ with respect to their age - t = 0.69, ns.

2.1. Psychometric characteristics of MAT - 50/BG - 2

2.1.1. Internal consistency

To examine the reliability of a MAT - 50 / BG - 2 as a measure of the individual differences in ambiguity tolerance, a study of its internal consistency was carried out. Table 2.4 shows the Alpha coefficients of Cronbach that were obtained for the whole scale of 61 items. Although they were very high and indicated an acceptable internal consistency of the scale, there were several unreliable items which correlated very low (below 0.10) with the total score derived from the scale. These

unreliable items (No 7, 8, 11, 12, 24, 26, 49, 51, 61) were omitted in a stepwise procedure to obtain the best possible combination of items, i.e. the set of items which yields the highest Alpha coefficient.

Table 2.4. Cronbach's Alpha coefficients of internal consistency for MAT-50/BG-2

Group	N	Alpha
Total	935	0.85
Boys	440	0.85
Girls	495	0.85
High school students	392	0.82
University students	427	0.87

Of the 9 items that were eliminated, 4 concern social relations and interpersonal communication and 2 others belong to the category of "philosophy" - two areas in which cross cultural differences are salient. For example, the item "Whenever I am in a new group, I usually take the initiative to introduce myself" has a very low rate of acceptance - 26 to 31% in the different subgroups of the sample, and is practically unrelated to the total score. All this probably because it describes a rather atypical behaviour for Bulgarian adolescents. When they go to a new place or join a new group, very seldom it happens in a way that involves uncertainty. Usually they are accompanied by a friend who is already known there and who introduce them.

A philosophy item that was dropped out is "With no exception every problem has a solution". Although reformulated during the revision of the first questionnaire MAT - 50/BG -1, it still has marked asymmetrical distribution (up to 77% of acceptance) and correlates zero with the total score from the scale. It may be seen as a common truth, a very general and stereotypical statement which hardly relates to personal style of life and individual's experience of complexity and uncertainty.

For the rest of 52 items the psychometric characteristics that were obtained are given in Table 2.5. The internal consistency of the scale has slightly improved as a result of the elimination of the unreliable items and matches very well the internal reliability reported by Norton (1975) which is r = 0.88 (Kuder - Richardson). Since further elimination of items would only decrease the Alpha coefficient this 52-item version of MAT - 50/BG - 2 was adopted as a measure for ambiguity tolerance (AT) in this study. It has very good internal consistency in the sample as a whole and in its subgroups as well what makes it a good instrument for examining sex and age differences in ambiguity tolerance.

Table 2.5. Cronbach's Alpha coefficients of internal consistency for the shortened 52-item version of MAT - 50/BG - 2

Group	N	Alpha - Cronbach
Total	935	0.86
Boys	440	0.86
Girls	495	0.87
High school students	392	0.84
University students	427	0.88

2.1.2. Test - retest reliability

In March 1997, after a 3-month interval, a part of the initial sample was re-tested to ensure the stability of the measurement. A total of 188 subjects were given MAT - 50 / BG - 2 again, of them 50 % are boys and 57% are high school pupils. Students from the Medical University and the National Academy for Theatre and Film Arts were retested. High school students were retested in the Language school No 33 in Sofia.

Pearson correlations for the 50-item version of MAT - 50/BG - 2 were computed between the individual scores in the first and the second testing. The obtained coefficients of correlation provided measures of reliability for the ambiguity tolerance scores from the shortened version of MAT - 50/BG - 2 questionnaire. The results are given in Table 2.6.

Table 2.6. Pearson coefficients of correlation for a 3-months time interval of test - retest with the shortened version of MAT - 50/ BG -2.

	N	R	p
Total	188	0.80	0.000
Boys	94	0.81	0.000
Girls	94	0.79	0.000
High school students	107	0.80	0.000
University students	81	0.78	0.000

The observed correlations are all statistically significant at the highest level of significance and range from 0.78 to 0.81. They are close to the test -retest reliability of 0.86 reported by Norton (1975) for a 10 to 12 week period. The stability of the

measurement of AT provided by the shortened version of MAT - 50 / BG - 2 is also supported by the comparison of the mean scores obtained in the first and the second testing. The method t-test for paired samples was used. The obtained results show that there are no significant change in AT scores of the sample as a whole and within its subgroups during this 3 month interval (Table 2.7). These findings match very well the adopted psychometric standards for test - retest reliability and gives support for the further use of the 52 item version of MAT - 50 / BG - 2 as a reliable measure of individual differences in ambiguity tolerance.

Table 2.7. Means, standard deviations and t-criteria for the first and the second testing with MAT - 50/BG - 2 in a 3 - month period

	AT - 1st testing	AT - 2nd testing	T, p
Total N = 188	M =131.5 SD = 18.7	M =131.4 SD = 18.5	0.12, ns
Boys N = 94	M =132.2 SD = 19.1	M =132.4 SD = 18.8	0.18, ns
Girls N = 94	M =130.7 SD = 18.3	M =130.3 SD = 18.3	0.34, ns
High school students N = 107	M =128.1 SD = 17.8	M =127.7 SD = 18.6	0.31, ns
University students N = 81	M =135.9 SD = 18.9	M =136.1 SD = 17.5	0.15, ns

2.1.3. Content validity

Hierarchical cluster analysis was performed on the 52 item version of MAT - 50/BG - 2. The cluster analysis revealed the existence of groups of interrelated items as well as of items that remain independent of this clustering. They are weekly interrelated among themselves and appear separately as different indicators of ambiguity tolerant / intolerant behaviour.

The first cluster covers a group of items describing beliefs and attitudes about perceived ambiguity in arts and in life in general. For example, "In arts I tend to like obscure or hidden meanings", "In a good novel it should always be clear who is the good and who is the bad character" or "People's behaviour can always be evaluated as "right - wrong" and "Ambiguous situations appeal to me".

The second cluster gathers items which emphasise the subjective emotional reactions to ambiguous situations which can be passive under the form of anxiety and different worries or active like being irritated or angry. Examples: "In a decision -

making situation in which there is not enough information to process the problem, I feel very uncomfortable"; "It bothers me a lot when different close friends of mine had conflicting opinions of me". Three subclusters emerge in this cluster according to the type of ambiguous situations: 1) ambiguity associated with interpersonal relations - "It intensely disturbs me when I am uncertain of how my actions affect others"; 2) unclear social context - "I can't enjoy parties when I don't know most of the people there", and 3) common everyday situations like "It really bothers me when a person shows up late for an appointment without an explanation".

A third, small cluster includes everyday habits concerning time and order like "It matters to me to know what day it is" and "Whenever I go on a long trip, I like to keep track of the kilometres to go".

The results of the cluster analysis give further support for the content validity of MAT - 50/BG - 2. It indicates that the internal structure of the questionnaire, although not clearly defined, relates to the main psychological components of the concept of ambiguity tolerance: cognition (perception of a situation as a source of ambiguity) and emotion (subject's positive or negative reaction to and experience of this situation).

In the psychological literature a theoretical discussion takes place concerning the multidimensionality of the concept of ambiguity tolerance. The multi-componential approach was adopted by R. Norton himself in the process of construction of MAT - 50. He however reported no empirical data confirming the 8 - dimensional structure of ambiguity tolerance he postulated. Our findings provide some empirical evidence in this sense and prove interesting a further study of the internal structure of the questionnaire. This is however not implied by the aims of this project; that is why we will stick up to the way the author himself applies the questionnaire and will use the total score from the shortened 52 item version of MAT - 50/BG - 2 as a measure of ambiguity tolerance in our analyses.

2.1.4. Distribution of the individual scores

For the 52 - item version of MAT - 50 / BG - 2 the highest possible score is 208 and the lowest - 52. The empirically observed distribution of individual scores varies from 76 to 187. The following characteristics of the empirical distribution of the sample N = 935 were obtained: Mean = 128.01; SD = 19.4; Median = 127; Mode = 118.

The mean being so close to the mode and the median suggests a normal distribution of the row scores which is very well illustrated on Figure 1. 16 % of the cases score lower than one standard deviation below the mean and also 16% of the subjects have scores higher than one standard deviation above the mean.

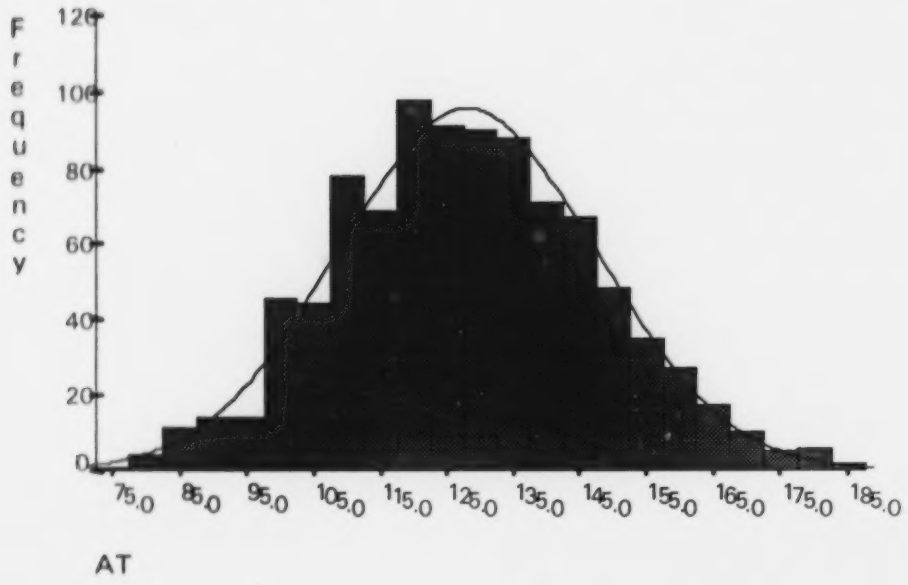


Figure 2.1. Histogram of ambiguity tolerance scores from the 52-item version of MAT - 50/ BG - 2 compared to the normal curve

2.2. Differences in ambiguity tolerance related to subjects' sex, age and education

2.2.1. Sex differences

No significant sex differences were found in the Bulgarian adolescent population as a whole (Table 2.8), neither between boys and girls in the high school and university subsamples. It should be noticed that in the subsample of working adolescents boys score higher than girls and this difference is just close to statistical significance. It is difficult to suggest some satisfactory explanation of this result. This group is smaller than the two others and the finding needs further replication. After leaving the secondary school, these boys and girls live in sometimes very different worlds. It might be that the different professional and life opportunities that are available for boys and girls account for this difference in ambiguity tolerance among them.

Table 2.8. Means, standard deviations and t-criteria for boys and girls in the sample as a whole and within the different subgroups.

	High school students	University students	Working adolescents	Total
Boys	M = 127.4 SD = 18.3 N = 155	M = 129.9 SD = 19.6 N = 221	M = 128.7 SD = 20 N = 64	M = 128.8 SD = 19.2 N = 440
Girls	M = 126.9 SD = 18.4 N = 237	M = 129.2 SD = 20.5 N = 206	M = 121.2 SD = 20.6 N = 52	M = 127.3 SD = 19.6 N = 495
t , p	0.23, ns	0.33, ns	1.97, p=0.051	1.20, ns

2.2.2. Age differences

Age and ambiguity tolerance scores are unrelated. None of the computed Pearson coefficients of correlation is significantly different from zero: in the sample as a whole (r=0.03); among high school pupils (r=0.08), university students (r=- 0.05) or working adolescents (r=0.10)

University students tend to score higher on ambiguity tolerance (M=129.6; SD=20, N=427) than high school students (M=127.1; SD=18.3; N=392) but this difference does not reach statistical significance - t = 1.83, p=0.067.

Within the high school subsample, no significant differences were found in ambiguity tolerance (AT) scores between different grades (Table 2.9) - F = 0.33, df=2, ns.

Table 2.9. Means and standard deviations for AT by school grade

AT	9th grade	10th grade	11th grade
Mean	127.1	126.2	128
SD	19.4	17.3	18.5
N	117	137	138

Two-way analysis of variance by sex and grade confirmed the previous results that there are no significant sex and age differences in ambiguity tolerance in high school students neither these two factors interact:

F (sex) = 0.05, df=1, ns

F(grade) = 0.33, df=2, ns

F(sex*grade) = 0.28 df=2, ns

Table 2.10 shows the results of one-way ANOVA by year of education in the university students subsample which indicate statistically significant age differences - F = 4.30, df=3, p=0.005.

Table 2.10. Means and standard deviations for AT by year of education

AT	1st year	2nd year	3rd year	4th year
Mean	135.2	126.1	127.5	129.5
SD	18.2	21.5	20.1	19.2
N	105	106	102	114

There is a significant drop in ambiguity tolerance from the first to the second year of university education which is thereafter compensated by gradually increasing up in the third and fourth years of education to achieve AT scores at the end of the university studies that are very close to the average values for the examined population. To illustrate this dynamics, t-test comparisons between mean AT scores per year of education are given below:

T (1st - 2nd year) = 3.32, p=0.001
T (1st - 3rd year) = 2.90, p=0.004
T (1st - 4th year) = 2.26, p=0.025
T (2nd - 4th year) = 1.23, ns

Two-way analysis of variance by sex and year of education confirmed the previous results that there are no significant sex differences in ambiguity tolerance in university students but there are statistically significant age differences. These two factors do not interact as it has been already shown for the high school subsample:

F (sex) = 0.20, df=1, ns
F(grade) = 4.33, df=3, p=0.005
F(sex*grade) = 1.21, df=3, ns

Does tolerance of ambiguity vary with age? Our data do not reveal the age of the subjects to be responsible for the differences in ambiguity tolerance among them. To the extent that age-related differences in AT scores are observed they are probably due to associated with the age differences in the position of the adolescent in the social and educational structures. Tatzel (1980) has identified age differences in adult college students in the direction that the age group 25-29 years score significantly lower ($p<0.05$) on AT both than younger (24 years and below) and older (30-34 years) students. There were no other significant comparisons, so the author concludes that "for most of adulthood, the trait remains steady" (Tatzel, 1980, 378).

2.2.3. Differences related to subjects' education

2.2.3.1 Differences related to subjects' educational level

Working adolescents aged 18 - 25 years score lower on ambiguity tolerance (M=125.4, SD=20.5, N=116) than university students of the same age group (M=129.6, SD=20; N=427) and this difference is great enough to be statistically significant - T = 2.00, p=0.046. In the examined age group - 18 - 25 years, the educational level (secondary vs. university education) seems to influence the individual differences in ambiguity tolerance. This finding is in line with the above mentioned influences of the educational context on the individual differences in ambiguity tolerance.

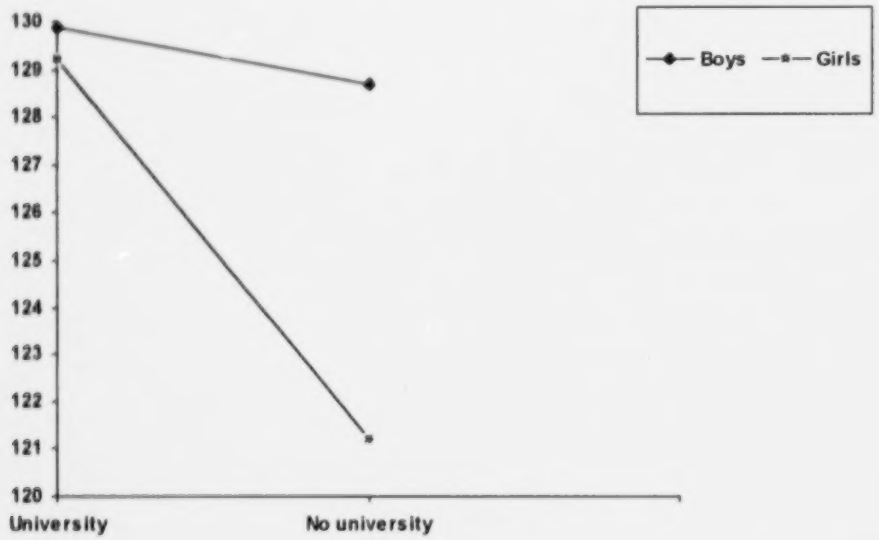


Figure 2.2. AT scores for boys and girls who do and do not study at a university level

The observed difference is mainly due to the significantly lower scores of girls non enrolled in a university - t = 2.52, p = 0.012 (Figure 2.2). This result goes in line with the observed close to significance gender differences in the subsample of working adolescents. Girls who don't study in a university have the lowest AT scores in the age interval 18 - 25 years. Since nothing but sex and age was gathered as a biographical information from this group, we can only hypothesise which are these differences in the life status in boys and girls not going to a university which may relate to differences in AT.

2.2.3.2 Differences related to the high school setting

There are differences between the AT scores of the students in Sofia and outside the capital (Table 2.11) that tend to be significant - F = 2.53, df=2, p=0.08.

High school students in the small town score lower on AT from both the regular secondary school in the capital (T=1.86, p=0.06) and the one specialised in foreign languages (T=2.07, p=0.04), the second difference being statistically significant. This finding further support the contextual influences on the development of ambiguity tolerance.

Table 2.11. Means and standard deviations for AT by school setting

AT	Secondary school No 127 in Sofia	H. Botev Secondary school in Nova Zagora	Language school No 33 in Sofia
Mean	128.5	124.3	128.8
SD	19.7	17.1	17.9
N	128	137	127

The different social context (big capital city vs. small provincial town) implies different life experiences for adolescents, different life perspectives and possibilities to cope with developmental challenges. Boys and girls in Nova Zagora can hardly be unaware of their restricted opportunities for professional, educational and personal realisation. For them, the choice to be made out of alternatives for the future is more difficult: it may involve change of the place to live, separation from the family and the friends and also serious financial problems.

2.2.3.3. Differences related to the type of university education

There are significant differences between the AT scores of the students coming from different universities (Table 2.12) - F = 10.05, df=3, p=0.000.

Table 2.12. Means and standard deviations for AT by university

AT	Theatre and Film Arts Academy	University of Sofia	Medical University	Technical University
Mean	138.1	131.2	126.6	125.8
SD	17.2	22.4	19.5	20.1
N	108	35	118	166

Students in arts score significantly higher on AT than both medical (t = 4.67, p=0.000) and technical students (t = 5.25, p=0.000) and also tend to be more ambiguity tolerant than their colleagues from the University of Sofia (t = 1.91, p=0.058). This finding further supports the suggestion that the development of ambiguity tolerance is moderated by contextual factors. AT is related to student` s chosen field of study. Tatzel (1980) also report that students in Arts score significantly higher in AT than Business students on Budner's scale, finding she sees as supporting the linkage of AT with creativity and mental flexibility.

To examine further this question, age differences between students from different years of education were analysed separately for each university (Figure 2.3). The University of Sofia students were excluded from this analysis since this is a very small group.

Table 2.13. Means and standard deviations for AT per year of education in the Theatre and Film Arts Academy

AT	1st year	2nd year	3rd year	4th year
Mean	142	138.4	129.8	140.1
SD	15	16.9	20.5	15.6
N	32	23	23	30

The one way ANOVA by year of education reveals just close to the statistically significant level age differences in the AT scores: F = 2.59, df=3, p=0.057. Third year students in acting score significantly lower than 1st year students (T=2.56 p=0.013) and 4th year students (t=2.08, p=0.043).

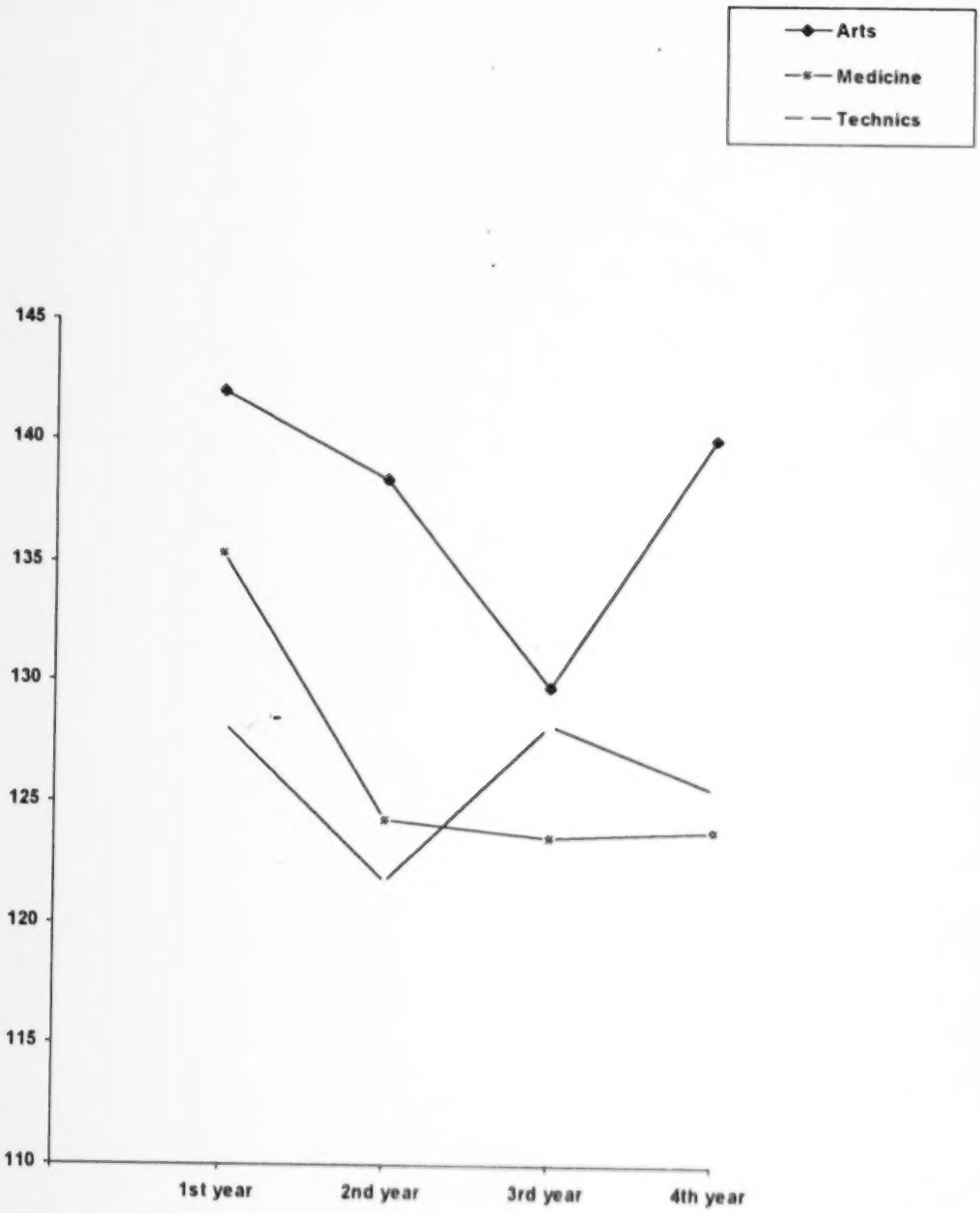


Figure 2.3. AT scores of students from 1st to 4th year of education from different universities

Table 2.14. Means and standard deviations for AT per year of education in the Medical University

AT	1st year	2nd year	3rd year	4th year
Mean	135.3	124.3	123.6	123.9
SD	16.8	21.5	18.9	18.7
N	28	30	23	37

There are differences in AT scores of the different age groups that just miss significance - F = 2.54, df=3, p=0.06. First year medical students score significantly higher than any other group: t (1st - 2nd year) = 2.17, p=0.034; t (1st - 3rd year) = 2.35, p=0.023; t (1st - 4th year) = 2.55, p=0.013

In the Technical University (Table 2.15) there are no significant differences between the examined age groups: F = 1.13, df=3, ns, although the general tendency for 2nd year students to be less tolerant of ambiguity than others can be observed in this university too.

Table 2.15. Means and standard deviations for AT per year of education in the Technical University

AT	1st year	2nd year	3rd year	4th year
Mean	128.3	121.8	128.2	125.6
SD	18.5	21.6	19.9	19.1
N	42	53	44	27

The reported empirical data support our expectations that age-related differences in AT among university students depend on the type of university. It is difficult to say why on the basis of our data only. Many factors may contribute to these differences: the nature of education students receive; instructional methods that are used; to what extent the education stresses the personality development or the acquisition of instrumental professional skills; students - professors relationships and the social climate; different opportunities for professional realisation in the future. Research on psychological environmental presses in a university setting on personality development of students (Adams and Fitch, 1983) suggests prospective lines of future investigations in this field.

3. STUDY TWO: *How ambiguity tolerant adolescents compare with those who are intolerant of ambiguity on different cognitive and personality characteristics ?*

May - July 1997

3.1. Selection of the group of high and low ambiguity tolerant adolescents

51 low AT students and 55 high AT students took part in the second stage of the study (Table 2.1). The proportion of boys vs. girls in the groups reflects the proportion of boys vs. girls in the whole high school sample. They come from all three schools that have been involved in the first study (Table 2.2). Their is no statistically significant difference between the mean age of Low AT (M=15.78, SD=0.76) and High AT (M=15.85, SD=0.76) students - t =0.48.

Table 2.1. Distribution of the sample by sex and AT groups

Gender/ AT group	Low AT	High AT
Boys	19	32
Girls	19	36

Table 2.2. Distribution of the sample by school and AT groups

School / AT group	Low AT	High AT
127 Secondary School in Sofia	12	16
33 Language School in Sofia	19	20
Secondary School "H. Botev" in Nova Zagora	20	19

Subjects were selected on the basis of their AT scores from the first study as those scoring below or above half standard deviation from the mean of the high school subsample (N=392, M=127.10, SD=18.32). t-test comparison of the mean AT scores of the two groups yielded a statistically significant difference - t=23.85, p=0.000. Therefore, the way groups were selected provided us with subjects to be examined who really differ in their tolerance to uncertainty and who represent the two contrasting strategies with respect to ambiguous situations, events and ideas very well (Table 2.3).

Table 2.3. Descriptive statistics and t-value for High and Low At groups

Sample	Low AT Group	High AT Group	t
N	51	55	
AT score	M=104.61, SD=7.88	M=149.76, SD=11.41	23.85 ***

Subjects were selected on the basis of their AT scores from the first study as those scoring below or above half standard deviation from the mean of the high school subsample (N=392, M=127.10, SD=18.32). In each group about 50% of the subjects have AT scores below/above one standard deviation from the mean of the high school subsample. They come from all three schools involved in the first study and 36% of them are boys.

The Low AT group has a mean score in AT 104.61 and standard deviation 7.88. This mean score is itself below one standard deviation below the mean of the high school subsample. Also, 55% of the subjects in this group have AT scores below one standard deviation below the mean of the high school subsample.

The High AT group has a mean score in AT 149.76 and standard deviation 11.41. This mean score is itself above one standard deviation above the mean of the high school subsample. Also, 53% of the subjects in this group have AT scores above one standard deviation above the mean of the high school subsample.

3.2. Method

The High and Low AT adolescents were compared on cognitive and personality measures that have been revealed to relate to ambiguity tolerance (Jonassen and Grabowski, 1993). The instruments that were used have been chosen for their popularity in the psychological literature, acknowledged reliability and validity and availability of Bulgarian adaptations.

Cognitive measures: CF.2A Tests of Intelligence of R.B.Cattell, standardised for Bulgarian population by Paspalanova and Stetinski (1985);

- Torrance Tests of Creative Thinking, Verbal and Figural Forms, adapted for use with Bulgarian population Stoycheva (1988, 1990).

Personality Measures: Eysenck Personality Questionnaire (EPQ), standardised for Bulgarian population by Eysenck, Paspalanov and Stetinski (1984). Provides scores on extroversion, emotional stability, psychotism and social desirability (lie);

- STAI (State-Trait Anxiety Inventory) of C. Spielberger, standardised for Bulgarian population by Stetinski and Paspalanov. (1989);

- Questionnaire for measuring need of achievement, constructed and standardised for Bulgarian population by Paspalanov and Stetinski (1988);

- Offer Self-Image Questionnaire for Adolescents (OSIQ), standardised for Bulgarian population by Sylguidjan and Gerganov (Sylguidjan, in press).

Procedure. Subjects were given the tests in 4 consequent sessions:

1 session: STAI of Spielberger, followed by CF.2A test of Intelligence of Cattell in a group testing format;

2 session: personality questionnaires for need for achievement, EPQ and OSIQ.

3 session: Verbal Form A of TTCT, Activities 4 to 7, for 30 min of group testing.

4 session: Figural Form B of TTCT, for 30 min of group testing.

Each session was scheduled for a different day. The testing was done within the regular classroom context. In some cases personality questionnaires were given to be filled in at home, individually. Since not all of the subjects were present at all testing sessions, for each of the following analyses is indicated the number of cases it is performed on.

3.3. Results

3.3.1. Intelligence

High AT students (M=32.44, SD=4.27, N=52) score better than Low AT students (M=29.40; SD=6.92, N=48) - t =2.62, p=0.01. It should be mentioned that both means are within the average scoring zone for the general Bulgarian population of this age. Compared to the Bulgarian norms, 23% in the both AT groups score high in intelligence (one standard deviation above the mean) i.e. the differences are due to the greater number of low scorers (one standard deviation below the mean) in the Low AT group - 27% vs. 4% in the High AT group. This result conforms to the findings that High AT individuals perform better on complex tasks and to the theoretical postulates that relate AT with cognitive complexity - simplicity.

3.3.2. Creative thinking skills

The Verbal Form of the TTCT is scored for fluency (the number of the generated solutions to the problem), flexibility (defined as a change in the subject's approach to the task, shifts in attitudes or focus on the problem) and originality (the degree to which unusual, unique ideas are generated, that are away from the obvious and commonplace).

Table 2.4. Means, standard deviations and t-criteria for verbal creativity

Indicators/AT groups	Low AT N = 34	High AT N = 38	t, p
Verbal fluency	M=28.29, SD=12.33	M=31.37, SD=12.30	1.06, ns
Verbal flexibility	M=13.21, SD=4.76	M=14.42, SD=5.53	0.99, ns
Verbal originality	M=18.71, SD=10.66	M=27.18, SD=17.20	2.48, p=.016

As it is shown in Table 2.4, high AT students score higher on all verbal indicators but the difference is statistically significant for originality only: they generate more original, non-trivial, unusual ideas and solutions to open-ended verbal tasks. The greater variance in the High AT group (F=3.85, p=0.054) is due just to the individuals with very high scores on originality.

The Figural Form is scored for fluency, originality, elaboration (the number of details used to elaborate the pictures), abstractness of titles (the degree to which the titles given by the children to their pictures go beyond what can be seen) and resistance to premature closure (a measure of the ability to "keep open" and to resist to natural psychological urge to close the incompleteness by the simplest, easiest solution).

With respect to the results on the Figural form, High AT students score significantly higher on Abstracness of titles (Table 2.5): they produce more creative, inventive, imaginative and abstract titles to the pictures than do Low AT students. Here again the greater variance in the High AT group (F=15.39, p=0.000) is due just to the individuals with very high scores on this parameter.

Table 2.5. Means, standard deviations and t-criteria for non-verbal creativity

Indicators/AT groups	Low AT N = 35	High AT N = 34	t, p
Figural fluency	M=16.83, SD=7.16	M=17.00, SD=4.96	0.12, ns
Figural originality	M=12.51, SD=5.53	M=12.21, SD=5.08	0.24, ns
Elaboration	M=77.63, SD=34.11	M=92.53, SD=55.05	1.36, ns
Abstractness of titles	M=3.80, SD=2.68	M=7.00, SD=4.91	3.35, p=.002
Resistance to closure	M=9.74, SD=3.57	M=8.56, SD=3.01	1.49, ns

3.3.3. Anxiety

The obtained results (Table 2.6) follow both the empirical findings about ambiguity tolerance as a personality variable and the theoretical descriptions of the syndrome of ambiguity intolerance as being manifested in increased anxiety.

Table 2. 6. Means, standard deviations and t-criteria for anxiety

Indicator/AT groups	Low AT N=48	High AT N=49	t, p
State anxiety	M=39.08, SD=11.76	M=36.92, SD=9.24	1.01, ns
Trait anxiety	M=44.47, SD=11.02	M=39.59, SD=9.40	2.34, p=.022

At scores are negatively correlated with trait anxiety for the sample as a whole as well - r = - 0.29 ($p< 0.01$), suggesting a linear relationship between the two measures, while the correlation with state anxiety does not reach significance (r = - 0.17, $p< 0.09$). In both groups trait and state anxiety are strongly positively correlated - Low AT group has r = 0.74 ($p < 0.001$) and High AT group has r = 0.60 ($p < 0.001$). For the sample as a whole the score is r = 0.68 ($p < 0.001$).

3.3.4 Temperament

There is no significant differences on any of the dimensions what is in fact a good concurrent validity evidence for the dimension of ambiguity tolerance and its measurement through MAT-50/BG-2 questionnaire (Table 2.7).

Table 2.7. Means, standard deviations and t-criteria for EPQ parameters

E P Q/ groups	Low AT N = 41	High AT N = 48	t, p
Extroversion	M=14.51, SD=4.43	M=15.29, SD=4.11	0.86, ns
Emotional stability	M=12.12, SD=5.30	M=10.27, SD=5.60	1.59, ns
Social desirability	M=6.59, SD=3.41	M=6.29, SD=3.43	0.40, ns
Psychotism	M=4.51, SD=2.19	M=5.06, SD=3.97	0.83, ns

3.3.5. Need for achievement

There is no significant difference between the strength of achievement orientation in the two groups: Low AT students (M=12.73, SD=3.85, N=40) and High AT students (M=12.13, SD=4.43, N=48). Both scores don't differ significantly from a general high school sample data. Paspalanov and Stetinski (1985) report the following data: boys (M=13.52, SD=4.38, N=115) and girls (M=13.15, SD=4.18, N=73). Stoycheva and Zelyazkova (1992) have obtained for a sample of 117 high school students M=12.03 and SD=4.20. Therefore, with respect to achievement orientation, the two groups neither differ from each other nor from the general Bulgarian high school population.

3.3.6. Self - concept

Significant differences were found in the self-concept of Low and High AT students that are summarised in Table 2.8.

Table 2.8. Means, standard deviations and t-criteria for self-concept parameters

Indicators/AT groups	Low AT N = 38	High AT N = 46	t, p
PS-1 Impulse control	M=2.98, SD=0.86	M=2.81, SD=0.78	0.95, ns
PS-2 Emotional tone	M=2.81, SD=0.98	M=2.62, SD=0.98	0.85, ns
PS-3 Body & Self - image	M=2.90, SD=0.81	M=2.83, SD=0.73	0.41, ns
SS-1 Social relation-hips	M=2.57, SD=0.92	M=2.06, SD=0.67	2.95, p=.004
SS-2 Morals	M=2.91, SD=0.44	M=2.77, SD=0.66	1.17, ns
SS-3 Vocational & Educational goals	M=2.40, SD=0.50	M=2.25, SD=0.71	1.08, ns
SxS Sexual attitudes	M=2.78, SD=0.84	M=2.65, SD=0.63	0.79, ns
FS Family relations	M=2.61, SD=0.76	M=2.28, SD=0.75	1.95, p=.055
CS-1 Mastery of the External World	M=2.60, SD=0.73	M=2.38, SD=0.62	1.54, ns
CS-2 Psychopathology	M=2.65, SD=0.71	M=2.23, SD=0.64	2.86, p=.005
CS-3 Superior adjust - ment	M=2.62, SD=0.61	M=2.46, SD=0.63	1.24, ns
CS-4 Idealism	M=3.47, SD=0.77	M=3.18, SD=0.74	1.73, p=.087

High AT students report less overt symptoms of psychopathology in their self-descriptions; they report having better social relations, better developed capacity for empathy with others and better object relations. They also tend to be more idealistic in their self-projections in the future and see themselves as having better relations with their parents - they report more often to get along with them well.

The 2 - way analyses of variance by sex and AT group confirmed the significant main effect of AT level on verbal intelligence scores (F=6.87, df=1, p=0.01), verbal originality (F=5.86, df=1, p=0.02) and abstractness of titles given to pictures (F=11.50, df=1, p=0.001), psychopathology symptoms (F=9.44, df=1, p=0.003), trait anxiety (F=5.48, df=1, p=0.02) and the social self (F=8.80, df=1, p=0.004). ANOVA revealed only one significant interaction between subjects' gender and AT level and it concerns nAch scores (Figure 3.1). High AT boys scores higher on nAch while High AT girls have lower scores than their same-gender peers with Low AT. The size of this

differences is nonsignificant for both sexes: boys (t=1.19, ns) and girls (t=1.90, p=0.06). This is an interesting finding which points out to possible differences in the way AT is integrated in the personality structure of adolescents boys and girls; it needs however further replication with larger samples.

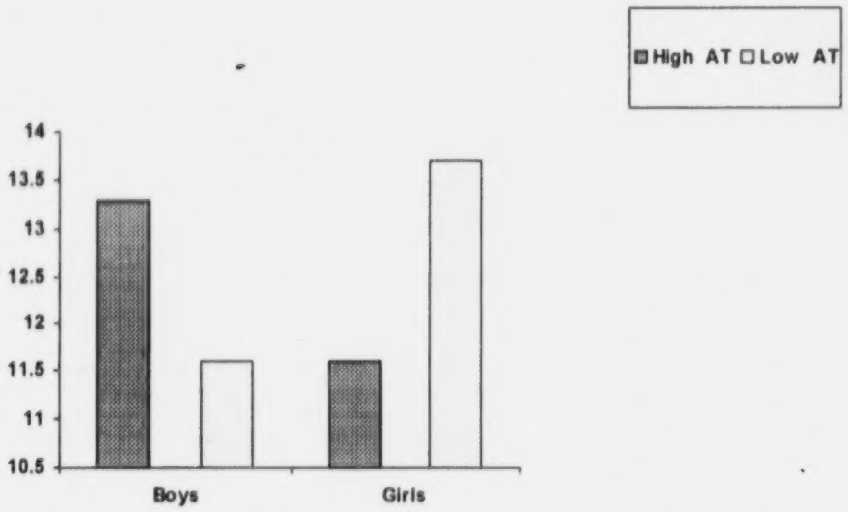


Figure 3.1. nAch scores for High and Low AT boys and girls

Discriminant analyses were performed to find out to what extent the examined individual differences in intelligence, creativity and personality can predict adolescents' AT level. The canonical discriminant function defined by the used set of variables correlates 0.84 with the grouping criteria (Wilks' lambda = 0.29, chi-square = 45.7, df=28, p=0.02) and can correctly classify as High or Low AT 74% of the subjects. The elimination of whatever variable, even among those unrelated to AT, decreases the predictive power of the function. The stepwise variable selection procedure revealed abstractness of titles (Step 1, Wilks' lambda = 0.86, p=0.005) and morals meaning sense of duty, responsibility to others, superego and conscienceness (Step 2, Wilks' lambda = 0.78, p=0.002) to be the best single predictors of differences in AT. The canonical discriminant function they define however correlates less with the grouping criteria - 0.47 (Wilks' lambda = 0.78, chi-square = 12.3, df=2, p=-.002) and can correctly classify into AT groups no more than 58% of the subjects. These results provide further evidence for both the cognitive component in AT and the role self-perception and self-regulation play in its development.

4. STUDY THREE: ***How the attitudes of teachers and parents influence the development of ambiguity tolerance in adolescents ?***

October - December 1997

4.1. Method

Subjects were drawn from 55th Secondary School in the capital Sofia and from the Natural Sciences and Mathematics School "Assen Zlatarov" in the town of Botevgrad in the north west of Bulgaria. They are students in grades 9th (n = 102), 10th (n = 105), 11th (n = 71) and 12th (n = 25) aged 14 to 19 (Mean = 16.5, SD = 0.97). In Table 4.1. is shown the distribution of the sample by sex and type of settlement.

Table 4.1. Distribution of the sample by sex and type of settlement

Sample	Capital city	Small town	Total
Boys	64	67	131
Girls	79	93	172
Total	143	160	303

Their teachers (n = 52) and parents (n = 236) took part in the study as well. The group of parents is balanced by educational level (53 % are university degree holders) and type of settlement (40 % are from Sofia). Their age ranges from 33 to 61 (Mean = 42, SD = 5) and 71% of those who filled in and returned the forms are mothers. Occasionally, the survey was answered by both parents (4%) or by other relatives whom the child lives with (1 %).

In the study were involved 27 teachers in Sofia and 25 teachers in Botevgrad what in fact is more than 90 % of all teachers having classes with the examined students. Their age ranges from 24 to 55 (Mean = 37.7, SD = 8.2). They have from 1 to 32 years of teaching experience in school (Mean = 11.9, SD = 8.2) and 25% of them are men

In this study were used the following *instruments*:

a) MAT-50/BG-3 - the third Bulgarian version of Norton's AT questionnaire MAT-50 containing these 52 items of MAT-50/BG-2 which have been used in the two previous studies as a measure of individual differences in AT.

b) Parents - Teachers AT Survey (PTATS) - an original instrument designed to assess adults' encouragement for ambiguity tolerant - intolerant (AT - AInT) behaviours in adolescents. A detailed description of the procedure of its construction is given in the Appendix to this report.

PTATS consists of 7 items describing ambiguity tolerant behaviours and 7 items describing ambiguity intolerant behaviours. Parents and teachers were given PTATS with the instruction to indicate how often they encourage these behaviours on a 4 point Likert type scale from 1 - "almost always encourage" to 4 - "almost never encourage". Students were asked 1) to indicate the importance they assign to these 14 behaviours on a 4 point rating scale from 1 - "it is important" to 4 - "it is not important"; 2) to rate on a 4 point scale from 1 - "almost always encourage" to 4 - "almost never encourage" how their teachers encourage these behaviours, and 3) to rate on a 4 point scale from 1 - "almost always encourage" to 4 - "almost never encourage" how their parents encourage these behaviours. Parents' form as well as Children-about-Parents form ask "whether and to what extent do you encourage (are encouraged) these characteristics within your family" and not just about the particular point of view of a parent. All PTATS forms are therefore Parents' form, Teachers' form, Children-about-Children form, Children-about-Teachers form and Children-about-Parents form.

Procedure. Students were tested in a group session within the regular classroom context. They were all first administered MAT-50/BG-3. Then they were given the three children's PTATS forms alternating their sequence in order to avoid an eventual halo effect of the different reference groups the instruction point on. At the end of the testing session students were given the Parents' PTATS form to be filled in at home by a volunteering parent and brought back to the school tomorrow. Parents' response rate varies from 65 % in Sofia to 86% in the small town. Teachers were tested either in a group (at teachers' room in the school) or individually (to fill in the questionnaire at home and return it to the psychologist in a appropriate for both of them time).

4.2. Differences in ambiguity tolerance related to subjects' sex, age and settlement

Coefficient Alpha of Cronbach of 0.83 was computed for this sample (0.84 for boys and 0.82 for girls) that indicates a high stability in the internal consistency measures of the Bulgarian adaptation of Norton's questionnaire for high school population. Also, the distribution of AT row scores in this study is very similar to the AT scores distribution among high school students in Study One (Mean = 123.3, SD =

17.6, Median = 123, Mode = 124, N = 255), therefore cross validating MAT-50/BG-3 scores as a measure of individual differences in AT.

Table 4.2. Means, standard deviations and t-criteria for boys and girls

Total	Boys	Girls	t, p
M = 123.3 SD = 17.6 N = 255	M = 123.4 SD = 18.7 N = 108	M = 123.2 SD = 16.7 N = 147	0.11, ns

As it was found in the previous study, there are no gender differences in AT scores (Table 4.2) and age and AT scores are unrelated - r = 0.07, ns. Similarly, the one-way analysis of variance by school grade (Table 4.3) revealed no significant differences in students' AT scores - F = 1.47, df = 2, ns. For the purposes of these analyses, the small number of 12^{th} graders (coming from the school in Sofia only) was added to 11^{th} graders since for all these students this is their last year in the secondary school. Although high school students in Sofia score higher in AT than their peers in the small town, this difference does not reach statistical significance - t = 1.37, ns.

Table 4.3. Means and standard deviations for AT by school grade

AT	9th grade	10th grade	11th grade
Mean	122.1	125.8	121.7
SD	16.7	18.1	17.8
N	81	89	85

Two-way analysis of variance by sex and grade confirmed the previous results that there are no significant sex and age differences in ambiguity tolerance in high school students neither these two factors interact:

F (sex) = 0.02, df = 1, ns

F(grade) = 1.44, df = 2, ns

F(sex*grade) = 0.01 df = 2, ns

Summarising the empirical data from the two studies reported here we can say that high school population is homogenous as to what sex and age differences in AT are concerned. Further research is needed to establish whether the differences between schools in the capital and outside the capital are school-based differences or due to the type of settlement per se.

4.3. Differences in AT - AInT encouragement by students, teachers and parents

Tables 4.4 to 4.8 summarise the information obtained with PTATS from both students and their teachers and parents. For each of the AT - AInT characteristics are shown the observed frequency (in %) of the different answers' categories in the respective group of subjects, their mean scores and standard deviations.

In the group of teachers few differences related to subjects' sex and settlement were found. Female teachers encourage to a greater extent students' non-traditional aesthetic preferences ($t = 3.94$, $p = 0.000$) and occupational choices ($t = 2.00$, $p = 0.05$). Teachers working in Sofia are more inclined than their colleagues in the small town to support pupils' willingness to participate in new and risky endeavours ($t = 2.22$, $p = 0.03$).

Parents with higher education less emphasise their children's preference for being on the safe side ($t = 3.39$, $p = 0.001$) and dealing with well known certain things ($t = 3.45$, $p = 0.001$). Those living in the small town are more unanimous in their stronger encouragement of norm-obliging behaviour in adolescents ($t = 2.21$, $p = 0.03$) and of choosing situations with clear chances for success ($t = 2.54$, $p = 0.01$) than parents in the big city do.

Students are rather homogeneous as a group in their attitudes toward AT - AInT behaviours. Boys assign less importance than girls to preferences for well known, certain things ($t = 1.98$, $p = 0.049$). No differences were found with respect to high school settlement. 9th graders more than older students consider "being on the safe side" important as a personality characteristic ($F = 3.47$, $df = 2$, $p = 0.03$).

Female students more than male ones see their teachers as encouraging them towards well established aesthetic values ($t = 2.31$, $p = 0.02$) and definite opinions about things ($t = 2.21$, $p = 0.03$). Students in Sofia describe their teachers as being more tolerant of non-traditional aesthetic values than do those in Botevgrad ($t = 2.16$, $p = 0.03$). 9^{th} graders perceive their teachers as encouraging preferences for traditional aesthetes values ($F = 3.99$, $df = 2$, $p = 0.02$) less and for unexpected situations and surprises ($F = 4.69$, $df = 2$, $p = 0.01$) more than older students do.

Boys describe their parents as more supportive for their willingness to take risk and initiate new activities than girls do - $t = 2.42$, $p = 0.02$. Students in Sofia see their parents as more tolerant towards their non-traditional vocational interests than their agemates in Botevgrad do - $t = 2.00$, $p = 0.047$.

Table 4.4. Teachers' degree of encouragement for AT - AInT behaviors

Characteristics	1 (%)	2 (%)	3 (%)	4 (%)	Mean	SD
1.Puts to test him(her)self by experimenting in different situations.	35	59	4	2	1.73	0.63
2.Prefers well established aesthetic values.	48	40	12	0	1.64	0.69
3.Holds definite opinion and judgments about most things.	25	48	21	6	2.08	0.84
4.Enjoys unexpected situations and surprises.	25	59	10	6	1.96	0.77
5. Chooses situations with clear chances for success.	25	28	37	10	2.31	0.97
6.Prefers situations with no strict rules and no prescribed ways of doing things.	25	38	29	8	2.19	0.91
7. Apt to non-traditional profession.	27	52	19	2	1.96	0.74
8.Avoids risks.	8	31	51	10	2.63	0.77
9.Puts to test his (her) abilities with complex tasks which he (she) might not succeed to solve.	46	35	17	2	1.75	0.81
10.Strictly follows the norms and the rules set at home and at school.	39	46	15	0	1.77	0.70
11.Prefers to be on the safe side.	21	46	25	8	2.19	0.86
12.Willing to participate in new endeavours and to take risk.	38	48	14	0	1.75	0.68
13.Prefers the well known certain things.	4	42	44	10	2.60	0.72
14.He (she) is rather original and non-traditional in his (her) tastes and preferences.	46	44	6	4	1.67	0.76

1- almost always encouraged
2- often encouraged
3- often not encouraged
4- almost never encouraged

Table 4.5. Parents' degree of encouragement for AT - AInT behaviors

Characteristics	1 (%)	2 (%)	3 (%)	4 (%)	Mean	SD
1. Puts to test him(her)self by experimenting in different situations.	36	49	9	6	1.84	0.81
2. Prefers well established aesthetic values.	47	38	11	4	1.72	0.82
3. Holds definite opinion and judgments about most things.	54	30	12	4	1.66	0.83
4. Enjoys unexpected situations and surprises.	25	59	10	6	2.37	0.96
5. Chooses situations with clear chances for success.	51	36	9	4	1.66	0.80
6. Prefers situations with no strict rules and no prescribed ways of doing things.	19	36	30	15	2.42	0.97
7. Apt to non-traditional profession.	21	32	24	23	2.48	1.07
8. Avoids risks.	39	32	21	8	2.00	0.97
9. Puts to test his (her) abilities with complex tasks which he (she) might not succeed to solve.	42	45	9	4	1.75	0.78
10. Strictly follows the norms and the rules set at home and at school.	58	35	5	2	1.50	0.69
11. Prefers to be on the safe side.	50	39	10	1	1.62	0.72
12. Willing to participate in new endeavours and to take risk.	20	43	24	13	2.30	0.93
13. Prefers the well known certain things.	44	40	14	2	1.73	0.76
14. He (she) is rather original and non-traditional in his (her) tastes and preferences.	28	46	17	9	2.06	0.89

1- almost always encouraged
2- often encouraged
3- often not encouraged
4- almost never encouraged

Table 4.6. Importance students assign to AT - AInT behaviors

AT - AInT characteristics	1 (%)	2 (%)	3 (%)	4 (%)	Mean	SD
1. Puts to test him(her)self by experimenting in different situations.	46	34	14	5	1.79	0.88
2. Prefers well established aesthetic values.	17	31	38	14	2.50	0.93
3. Holds definite opinion and judgments about most things.	44	40	11	5	1.79	0.85
4. Enjoys unexpected situations and surprises.	43	31	20	6	1.89	0.93
5. Chooses situations with clear chances for success.	48	35	11	6	1.75	0.88
6. Prefers situations with no strict rules and no prescribed ways of doing things.	30	34	24	12	2.17	0.99
7. Apt to non-traditional profession.	23	21	36	20	2.53	1.05
8. Avoids risks.	25	27	25	23	2.47	1.10
9. Puts to test his (her) abilities with complex tasks which he (she) might not succeed to solve.	37	30	19	14	2.10	1.06
10. Strictly follows the norms and the rules set at home and at school.	11	38	30	21	2.61	0.94
11. Prefers to be on the safe side.	39	33	20	8	1.97	0.95
12. Willing to participate in new endeavours and to take risk.	37	33	25	5	1.99	0.92
13. Prefers the well known certain things.	24	34	31	11	2.29	0.95
14. He (she(is rather original and non-traditional in his (her) tastes and preferences.	39	32	22	7	1.98	0.95

1- it is important
2- it is more important than unimportant
3- it is more unimportant than important
4- it is not important

Table 4.7. Teachers' degree of encouragement for AT - AInT behaviours as perceived by students

AT - AInT characteristics	1 (%)	2 (%)	3 (%)	4 (%)	Mean	SD
1. Puts to test him(her)self by experimenting in different situations.	18	29	30	23	2.57	1.04
2. Prefers well established aesthetic values.	32	48	14	6	1.94	0.84
3. Holds definite opinion and judgments about most things.	46	36	13	5	1.77	0.87
4. Enjoys unexpected situations and surprises.	9	18	42	31	2.96	0.93
5. Chooses situations with clear chances for success.	48	33	12	7	1.79	0.92
6. Prefers situations with no strict rules and no prescribed ways of doing things.	14	13	49	24	2.82	0.96
7. Apt to non-traditional profession.	8	25	40	27	2.85	0.92
8. Avoids risks.	36	35	16	13	2.05	1.02
9. Puts to test his(her) abilities with complex tasks which he (she) might not succed to solve.	38	36	15	11	1.98	0.98
10. Strictly follows the norms and the rules set at home and at school.	67	21	5	7	1.52	0.87
11. Prefers to be on the safe side.	50	38	10	2	1.65	0.75
12. Willing to participate in new endeavours and to take risk.	15	29	39	17	2.59	0.95
13. Prefers the well known certain things.	43	42	10	5	1.77	0.82
14. He (she) is rather original and non-traditional in his (her) tastes and preferences.	12	21	34	33	2.87	1.01

1- almost always encouraged
2- often encouraged
3- often not encouraged
4- almost never encouraged

Table 4.8. Parents' degree of encouragement for AT - AInT behaviours as perceived by students

AT - AInT characteristics	1 (%)	2 (%)	3 (%)	4 (%)	Mean	SD
1. Puts to test him(her)self by experimenting in different situations.	25	39	23	13	2.23	0.97
2. Prefers well established aesthetic values.	32	49	15	4	1.91	0.79
3. Holds definite opinion and judgments about most things.	45	33	18	4	1.82	0.88
4. Enjoys unexpected situations and surprises.	19	25	35	21	2.57	1.02
5. Chooses situations with clear chances for success.	56	33	7	4	1.59	0.79
6. Prefers situations with no strict rules and no prescribed ways of doing things.	16	31	36	17	2.53	0.96
7. Apt to non-traditional profession.	14	24	36	26	2.74	1.00
8. Avoids risks.	46	31	11	12	1.89	1.02
9. Puts to test his(her) abilities with complex tasks which he (she) might not succed to solve.	33	36	19	12	2.11	1.00
10. Strictly follows the norms and the rules set at home and at school.	50	33	12	5	1.72	0.86
11. Prefers to be on the safe side.	59	32	6	3	1.53	0.74
12. Willing to participate in new endeavours and to take risk.	13	33	38	16	2.58	0.91
13. Prefers the well known certain things.	46	39	12	3	1.72	0.79
14. He (she) is rather original and non-traditional in his (her) tastes and preferences.	25	31	31	13	2.33	1.00

1- almost always encouraged.
2- often encouraged
3- often not encouraged
4- almost never encouraged

Table 4.9 shows the results of the evaluation of the internal consistency of the PTATS scales.

Table 4.9. Cronbach's Alpha coefficients of internal consistency for PTATS scales

Group	N	Alpha - Cronbach		
		all items	AT items	AInT items
Teachers	52	0.74	0.63	0.74
Parents	236	0.62	0.67	0.64
Students	282	0.70	0.62	0.69
Students' perception of teachers	276	0.65	0.63	0.63
Students' perception of parents	274	0.70	0.67	0.68

The obtained coefficients of internal consistency range from 0.62 to 0.74 which values are acceptably high for this length of the scales. It is also important to notice that items making up the subscales are purposely designed to describe different areas of functioning, e.g. problem solving, social relations, vocational interests etc. In view of this diversity of the items the obtained Alpha coefficients indicate a reliability of the scale that is satisfactorily good.

The AT and AInT items have been treated separately to make two different subscores - AT Encouragement and AInT Encouragement, for each of the PTATS scales. Table 4.10 shows the differences between AT Encouragement and AInT Encouragement scores within each of the groups and the Pearson correlations between the two scores.

Male and female teachers are equally supportive to AInT behaviours but women stronger encourage AT behaviours in their students ($t = 2.45$, $p = 0.02$). This effect is mainly due to women's support for non-traditional vocational and aesthetic interests. Although older teachers tend to be more restrictive and certainty oriented in their reward strategies than younger ones and those with less experience at school, no statistically significant relations were found between teachers' age and years of teaching experience and the degree of encouragement of AT - AInT behaviours. There are no significant differences between the two types of settlement as well.

Table 4.10. Descriptive statistics, t - values and coefficients of correlations for the AT - AInT Encouragement scores of the different groups

Groups	AT Encouragement	AInT Encouragement	t	r
Teachers n = 50	M = 13.12 SD = 2.97	M = 15.16 SD = 3.48	2.76**	-.31*
Parents n = 224	M = 15.19 SD = 3.69	M = 11.92 SD = 3.17	9.85***	-.04
Students n = 282	M = 14.44 SD = 3.75	M = 15.42 SD = 3.88	2.73**	-.26***
Teachers as perceived by students n = 276	M = 18.74 SD = 3.80	M = 12.49 SD = 3.43	18.93***	-.15*
Parents as perceived by students n = 274	M = 17.09 SD = 3.98	M = 12.17 SD = 3.47	14.01***	-.21***

NB. Greater encouragement / importance is indicated by a lower score.

* - $p < 0.05$

** - $p < 0.01$

*** - $p < 0.001$

Parents with secondary education encourage AInT behaviours more than do those with university education - $t = 2.53$, $p = 0.01$; the two groups however do not differ in their attitudes towards AT characteristics. Parents in Sofia less emphasise AInT behaviours than those living in the small town ($t = 2.66$, $p = 0.009$) and do not differ from each other as to what AT behaviours are concerned. Parents with less education and those in the small town show greater appreciation for risks avoiding and certainty seeking behaviours in their children than university degree holders and big city's inhabitants. No significant differences in AT - AInT rewarding strategies were found with respect to parents' age and sex.

In the group of students were found no significant differences in AT - AInT Encouragement level related to subjects' sex, age and place of living, with two exceptions: 1) girls feel their parents encourage AInT behaviours more than boys do - $t = 2.25$, $p = 0.025$, and 2) 9th graders assign more importance to AInT values than 10th graders do - $F = 3.67$, $df = 2$, $p = 0.027$.

As it might be expected, the AT - AInT Encouragement levels are significantly and inversely related. The size of the correlations is not very high, however, and in the group of parents it is even non-significant. From a methodological point of view this finding justify the decision to consider the two scores separately. From a psychological point of view it suggests that there are evaluative standards operating with respect to avoidance behaviours aimed at minimising the negative effects of encounters with ambiguity and different ones are activated when parents think about adolescents' attempts to explore and handle ambiguity.

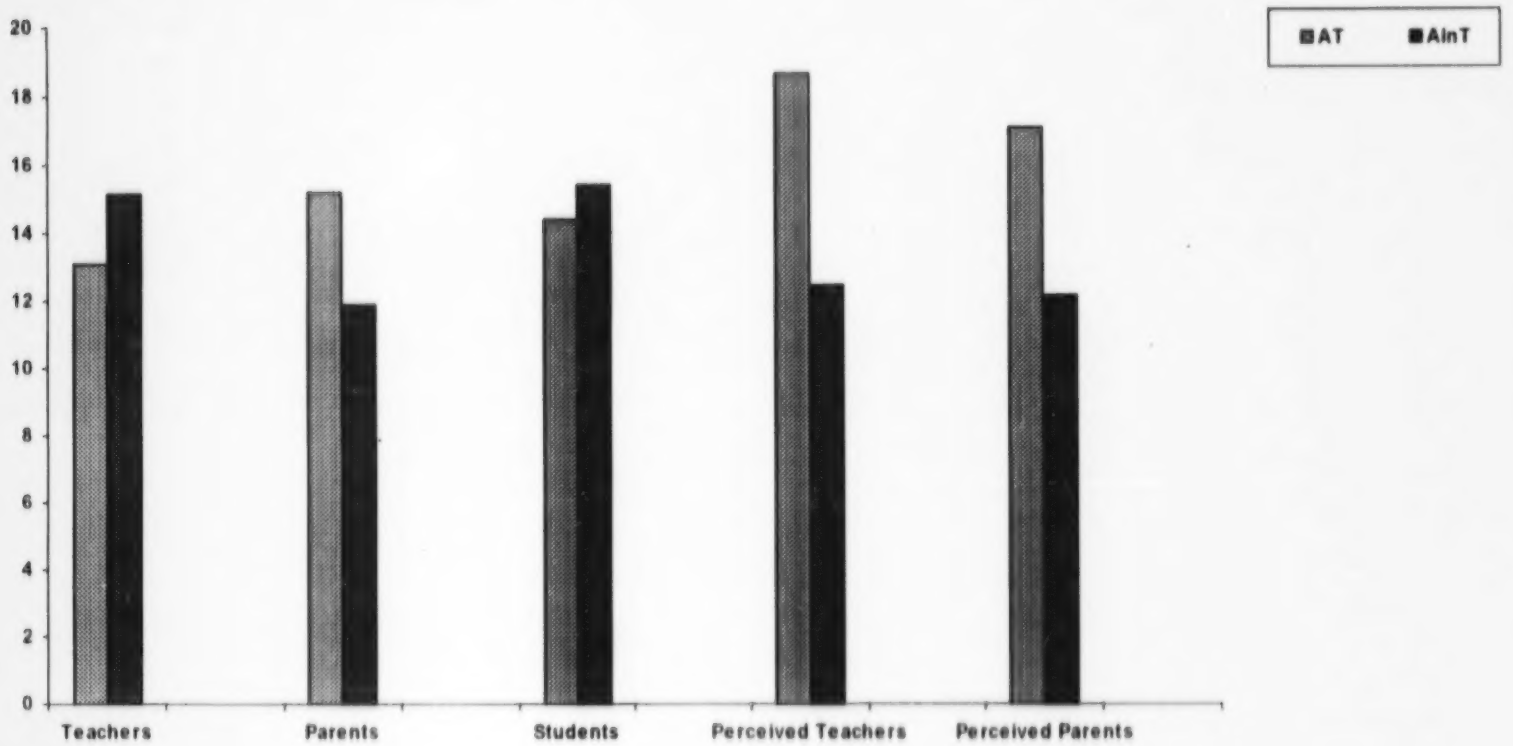
Table 4.11 presents the results of the t-tests carried out to compare the degree of AT and AInT Encouragement in the different groups (see also Figure 4.1).

Table 4.11. t - comparisons of AT - AInT Encouragement level in the different groups

Groups compared	AT Encouragement	AInT Encouragement
Teachers - Parents	3.97 ***	6.53 ***
Students - Teachers	2.61 **	0.44
Students - Parents	2.28 *	11.40 ***
Teachers - Perceived Teachers	10.32 ***	5.11 ***
Parents - Perceived Parents	5.52 ***	0.96
Students - Perceived Teachers	13.82 ***	9.76 ***
Students - Perceived Parents	10.07 ***	12.62 ***
Perceived Teachers - Perceived Parents	5.60 ***	1.20

* - $p < 0.05$
** - $p < 0.01$
*** - $p < 0.001$

Students value ambiguity tolerance more than ambiguity intolerance: ambiguity tolerant characteristics are rated as more important than those indicating ambiguity intolerant behaviours. Students perceive both their teachers and parents as being encouraging ambiguity intolerance more than ambiguity tolerance. They also describe adults as more intolerant of ambiguity than they are themselves. Especially the teachers - teachers' perceived AT Encouragement is the lowest of all scores. Adolescents feel parents and teachers put equally strong emphasis on risk avoiding and



* Greater encouragement / importance is indicated by a lower score

Figure 4.1 AT - AInT encouragement in students, teachers and parents

certainty seeking, but consider teachers as being significantly more discouraging orientations toward uncertain outcomes and uncommon choices.

Adults' self-reports clearly differentiate AT - AInT reward strategies of the two groups. Teachers report encouraging ambiguity tolerance to a greater extent while parents favour more ambiguity intolerant behaviours. Teachers' encouragement of ambiguity tolerance outpasses that of parents, and parents' AInT score exceeds teachers' respective score. Teachers report also encouraging ambiguity tolerance to a greater extent than students do it - teachers' self-reported degree of AT Encouragement is the highest of all scores for AT Encouragement. On the other side, parents are the group that most strongly support certainty oriented choices and behaviours.

Therefore, there is a strong discrepancy between adults' self-reported AT - AInT Encouragement and the way their reward strategies are perceived by students. Teachers see themselves as rather open to new and unusual ways of doing among their students, although they keep on the traditional, well known practice. Parents clearly emphasize certainty while not really opposing them to adolescents' life innovations. On the other side, adolescents think both their parents and teachers want them avoiding risks and uncertain outcomes but parents are also seen to have more favorable attitudes towards experimenting and going away from common models and activities.

Tables 4.12 to 4.14 show the relationships between children's scales of PTATS.

In children's perceptions, the AT - AInT attitudes of parents and teachers are very similar, suggesting a generalized attitude towards "what adults are, think and say" among adolescents. However, children see themselves being closer to their parents than to their teachers. How important children see AT- AInT behaviors is significantly correlated with what they perceive to be their parents' encouragement of these behaviors.

No systematic relations are found among students' AT - AInT values and perceived teachers' attitudes. The highest obtained correlations however point to a quite different mechanism. Children's AT values are unrelated to teachers' evaluation of AT characteristics but to teachers' AInT score - students who value AT higher think their teachers emphasize risk avoiding and certainty seeking behaviors to a lesser extent, especially the oldest children.

Table 4.12. Interrelations between students AT - AInT values and perceived AT - AInT Encouragement in parents

	Students' AT Importance	Students' AInT Importance
Perceived Parents' AT Encouragement		
Total	0.32 ***	- 0.02
Gender		
1. Boys	0.35 ***	0.01
2. Girls	0.31 ***	- 0.05
Settlement		
1.Capital city	0.26 **	0.05
2.Small town	0.37 ***	- 0.08
Age		
1. 9th graders	0.30 **	- 0.19
2. 10th graders	0.38 ***	- 0.03
3. 11th graders	0.28 **	0.10
Perceived Parents' AInT Encouragement		
Total	0.01	0.31***
Gender		
1.Boys	0.05	0.28 **
2.Girls	- 0.03	0.33 ***
Settlement		
1. Capital city	0.02	0.36 ***
2. Small town	0.02	0.25 ***
Age		
1.9th graders	- 0.01	0.45 ***
2. 10th graders	- 0.10	0.15
3. 11th graders	0.17	0.33 **

NB. Greater encouragement / importance is indicated by a lower score.

* - $p < 0.05$

** - $p < 0.01$

*** - $p < 0.001$

Table 4.13. Interrelations between students' AT - AInT values and perceived AT - AInT Encouragement in teachers

	Students' AT Importance	Students' AInT Importance
Perceived Teachers AT Encouragement		
Total	0.08	0.13*
Gender		
1.Boys	0.12	0.09
2.Girls	0.04	0.16 *
Settlement		
1. Capital city	0.08	0.06
2. Small town	0.08	0.19 *
Age		
1. 9th graders	0.06	0.17
2. 10th graders	0.13	- 0.05
3. 11th graders	0.06	0.25 *
Perceived Teachers' AInT Encouragement		
Total	0.19 **	0.07
Gender		
1.Boys	0.21 *	0.10
2.Girls	0.16 *	0.02
Settlement		
1. Capital city	0.14	0.11
2. Small town	0.23 **	0.02
Age		
1. 9th graders	0.06	0.00
2. 10th graders	0.12	0.03
3. 11th graders	0.41 ***	0.19

NB. Greater encouragement / importance is indicated by a lower score.

* - $p < 0.05$

** - $p < 0.01$

*** - $p < 0.001$

Table 4.14. Interrelations between perceived AT - AInT Encouragement in parents and teachers

	Perceived Teachers' AT Encouragement	Perceived Teachers' AInT Encouragement
Perceived Parents' AT Encouragement		
Total	0.31 ***	0.05
Gender		
1. Boys	0.37 ***	0.20 *
2. Girls	0.26 **	- 0.07
Settlement		
1.Capital city	0.32 ***	0.08
2.Small town	0.30 ***	0.02
Age		
1. 9th graders	0.38 ***	0.09
2. 10th graders	0.27 **	- 0.05
3. 11th graders	0.30 **	0.10
Perceived Parents' AInT Encouragement		
Total	0.04	0.45 ***
Gender		
1.Boys	0.03	0.52 ***
2.Girls	0.07	0.35 ***
Settlement		
1. Capital city	0.01	0.46 ***
2. Small town	0.08	0.43 ***
Age		
1.9th graders	0.03	0.49 ***
2. 10th graders	0.05	0.44 ***
3. 11th graders	0.06	0.42 ***

NB. Greater encouragement / importance is indicated by a lower score.

* - $p < 0.05$

** - $p < 0.01$

*** - $p < 0.001$

4.4. Relationships between students' ambiguity tolerance and AT - AInT values and perceived AT - AInT encouragement in teachers and parents

The relationship between students' scores on AT questionnaire MAT-50/BG-3 and PTATS scales for students, teachers and parents were examined through correlational analyses first. The coefficients of correlation for the sample as a whole are reported and within each of the examined subgroups as well in the search of variations in this relationship associated with the grouping variables. Then the group of students was divided into High and Low AT groups by the mean score of the empirical distribution. The Low AT group scores up to 124 points on MAT-50/BG-3 (n = 138) and the High AT group scores 125 points and above (n = 117). 4 - way analyses of variance of AT - AInT Encouragement by AT group (High and Low AT), sex (boys and girls), age (9^{th}, 10^{th} and 11^{th} graders) and type of settlement (capital city and small town) were then performed.

Table 4.15. Coefficients of correlation of students' AT scores on MAT-50/BG-3 with their perceptions of AT - AInT significance for themselves, their parents and teachers for the group as a whole and by gender

	Total	Boys	Girls
Students' AT Importance	- 0.06	- 0.04	- 0.08
Students' AInT Importance	0.48 ***	0.44 ***	0.52 ***
Perceived Parents' AT Encouragement	- 0.04	0.05	- 0.09
Perceived Parents' AInT Encouragement	0.24* **	0.22 *	0.28 **
Perceived Teachers' AT Encouragement	0.14 *	0.17	0.12
Perceived Teachers' AInT Encouragement	0.13 *	0.12	0.15

NB. Greater encouragement / importance is indicated by a lower score.
* - $p < 0.05$
** - $p < 0.01$
*** - $p < 0.001$

Students' scores on AT questionnaire MAT-50/BG-3 correlate moderately with their perception of AInT importance, correlate low with their perceptions of AInT

encouragement from their parents and seems practically unrelated to their perceptions of the encouragement of AT - AInT behaviours from their teachers (Table 4.15). Boys and girls with higher ambiguity tolerance also value risk-avoiding and certainty seeking strategies less. This finding, being a correlational fact, may be interpreted in both directions. Students who are less frustrated with ambiguous situations and events can afford being more tolerant with respect to certainty requirements. On the other hand, students' evaluative standards enable them to develop respective appropriate personality characteristics.

A very important point to mention is that this relationship concerns students' values for AInT behaviours while AT Encouragement is unrelated to individual differences in AT in all of the analyses. This suggests that more or less severe certainty pressures are in fact the process which corresponds to the development of AT in adolescents and not that much the development of specific strategies for coping with uncertainty and ambiguity of life.

Table 4.16. Coefficients of correlation of students' AT scores on MAT-50/BG-3 with their perceptions of AT - AInT significance for themselves, their parents and teachers by subgroups of settlement

	Capital city	Small town
Students' AT Importance	- 0.05	- 0.06
Students' AInT Importance	0.45 ***	0.50 ***
Perceived Parents' AT Encouragement	0.03	- 0.07
Perceived Parents' AInT Encouragement	0.23 *	0.25 **
Perceived Teachers' AT Encouragement	0.07	0.21 *
Perceived Teachers' AInT Encouragement	0.19 *	0.08

NB. Greater encouragement / importance is indicated by a lower score.
* - $p < 0.05$; ** - $p < 0.01$; *** - $p < 0.001$

The observed relationships do not depend on the place of living of the adolescents (Table 4.16). The analyses of variance revealed no significant 2-way interactions between AT group and students' settlement.

Table 4.17 Coefficients of correlation of students' AT scores on MAT-50/BG-3 with their perceptions of AT - AInT significance for themselves, their parents and teachers by age

	9th grade	10th grade	11th grade
Students' AT Importance	0.05	- 0.19	0.00
Students' AInT Importance	0.37 **	0.50 ***	0.53 ***
Perceived Parents' AT Encouragement	- 0.11	- 0.00	- 0.02
Perceived Parents' AInT Encouragement	0.30 **	0.14	0.28 *
Perceived Teachers' AT Encouragement	0.21	0.18	0.05
Perceived Teachers' AInT Encouragement	0.07	0.10	0.22

NB. Greater encouragement / importance is indicated by a lower score.

* - $p < 0.05$
** - $p < 0.01$
*** - $p < 0.001$

Both at the beginning and at the end of the high school cycle, students seem being more related to parents' standards than in its middle point, i.e. grade 10th. During the high school the interconnectedness between individual' personality characteristics and attitudes and beliefs tend to increase as we can see from the augmenting coefficients of correlations between children's ambiguity tolerance and their devaluation of certainty seeking and risk avoiding behaviours (Table 4.17). Close to significance 2-way interaction between AT group and students' grade was found as well - $F = 2.76$, $df = 2$, $p = 0.07$. Students with high and low ambiguity tolerance differ more and more in their attitudes towards AInT values which become less and less important for High AT group.

The 4 - way analyses of variance (AT group X sex X age X settlement) of AT - AInT importance for students revealed 1) significant main effect of AT group on students' perception of AInT values only ($F = 44.98$, $df = 1$, $p = 0.000$) - as it has been already noted, students with higher ambiguity tolerance value AInT behaviours

less than those with low ambiguity tolerance; 2) no significant 2 - way interactions between the AT group and subjects' sex, age and settlement.

The 4 - way analyses of variance (AT group X sex X age X settlement) of perceived AT - AInT Encouragement in parents revealed 1) significant main effect of AT group on students' perception of AInT Encouragement only ($F = 12.23$, $df = 1$, $p = 0.001$) - students with low ambiguity tolerance perceive their parents as more encouraging AInT behaviours than do those with high ambiguity tolerance; 2) no significant 2 - way interactions between the AT group and subjects' sex, age and settlement.

The 4 - way analyses of variance (AT group X sex X age X settlement) of perceived AT - AInT Encouragement in teachers revealed 1) significant main effect of AT group on students' perception of whether and to what extent their teachers encourage AT behaviours ($F = 6.40$, $df = 1$, $p = 0.012$) and AInT characteristics ($F = 4.12$, $df = 1$, $p = 0.044$) - students with higher ambiguity tolerance perceive their teachers as encouraging less both AT and AInT values; 2) no significant 2 - way interactions between the AT group and subjects' sex, age and settlement.

4.5. Relationship between students' AT - AInT values and parents' self-reported AT - AInT encouragement

The importance students' assign to ambiguity tolerance - intolerance values correlate significantly but very low with parents' self-reported encouragement of AT - AInT behaviours in their children (Table 4.18). This relation depends on students' sex, age and settlement. It is stronger for boys, adolescents living in the capital and older students. AT - AInT values of girls, younger students and those from the small town appear unrelated to their parents' encouragement of respective behaviours and personality characteristics.

Table 4.18. Coefficients of correlation of students' AT - AInT values with their parents' AT - AInT Encouragement for the sample as a whole and by subgroups of gender, settlement and age

	Students' AT Importance	Students' AInT Importance
Parents' AT Encouragement		
Total	0.18 **	- 0.03
Gender		
1. Boys	0.25 *	0.05
2. Girls	0.11	0.01
Settlement		
1.Capital city	0.21 *	0.07
2.Small town	0.17	- 0.11
Age		
1. 9th graders	0.05	0.03
2. 10th graders	0.20	- 0.13
3. 11th graders	0.36 **	0.07
Parents' AInT Encouragement		
Total	- 0.01	0.16*
Gender		
1.Boys	0.01	0.27 **
2.Girls	0.06	0.01
Settlement		
1. Capital city	0.06	0.21 *
2. Small town	- 0.06	0.08
Age		
1.9th graders	0.01	0.06
2. 10th graders	- 0.18	0.27 *
3. 11th graders	0.17	0.17

NB. Greater encouragement / importance is indicated by a lower score.

* - $p < 0.05$

** - $p < 0.01$

*** - $p < 0.001$

4.6. Relationship between students' ambiguity tolerance and parents' self-reported AT - AInT encouragement.

Students' row scores on AT questionnaire are unrelated to parents' encouragement for AT - AInT behaviours (Table 4.19). Significant but low positive correlation between parents' non-encouragement of certainty seeking behaviours and students' AT scores was found for boys, those living in the big city and 10^{th} graders. Whether or not parents encourage coping with ambiguity and support child's initiatives and risk taking, in most cases is irrelevant to their children's ambiguity tolerance.

Table 4.19. Coefficients of correlation of students' AT row scores on MAT-50/BG-3 with their parents' AT - AInT Encouragement for the group as a whole and by subgroups of gender, settlement and age

	Parents' AT Encouragement	Parents' AInT Encouragement
Total	- 0.14	0.08
Gender		
1. Boys	- 0.08	0.26 *
2. Girls	0.20 *	0.17
Settlement		
1. Capital city	- 0.13	0.22
2. Small town	- 0.15	- 0.06
Age		
1. 9^{th} graders	- 0.13	0.04
2. 10^{th} graders	- 0.17	0.26 *
3. 11^{th} graders	- 0.10	- 0.06

NB. Greater encouragement / importance is indicated by a lower score.

* - $p < 0.05$
** - $p < 0.01$
*** - $p < 0.001$

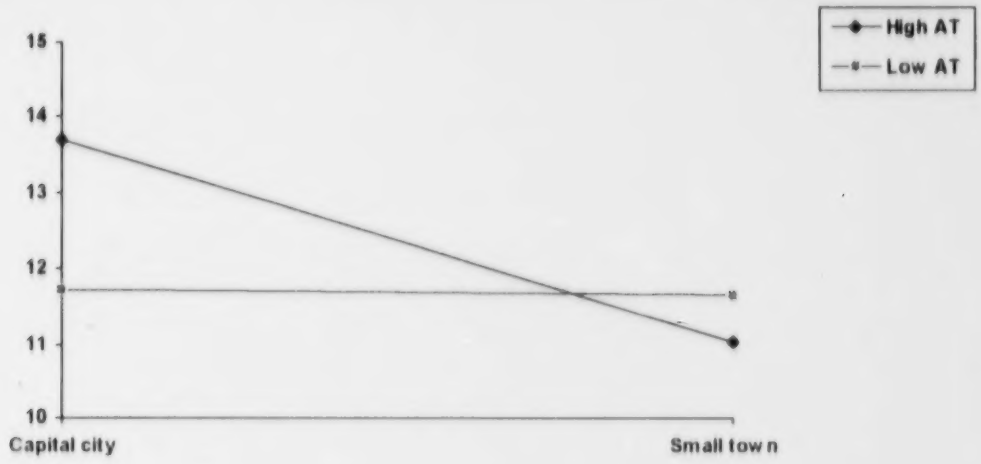
4 - way analysis of variance (AT group X sex X age X settlement) of parents' AT - AInT Encouragement revealed: 1) no significant main effect of AT group; 2) no significant interaction between AT group and subjects' age, and 3) significant 2 - way

interactions of AT group X settlement ($F = 3.90$, $df = 1$, $p = 0.05$) and AT group X sex ($F = 4.06$, $df = 1$, $p = 0.046$) for parents' encouragement of ambiguity intolerance.

Figure 4.2 illustrates the differences between High and Low AT groups in the two different types of settlement. High AT students from Sofia have parents who are least bound to AInT values ($t = 2.33$, $p = 0.02$) while in the small town there are no significant differences between parents' AInT Encouragement level of students with High and Low AT ($t = 1.15$, ns).

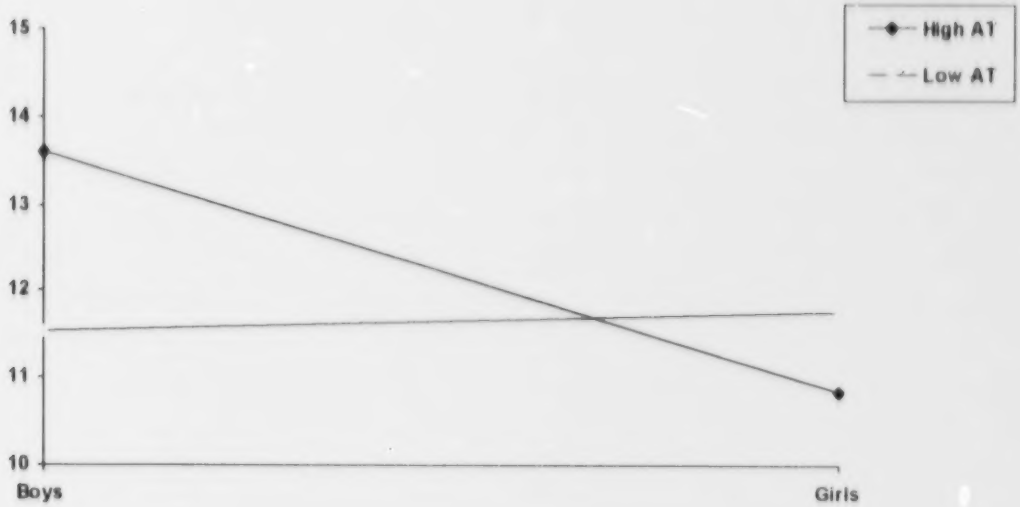
Figure 4.3 shows how subjects' gender moderates the relationship between ambiguity tolerance and parent's AInT Encouragement level. Boys with High AT have parents who are significantly less focused on AInT values ($t = 2.45$, $p = 0.02$), while among girls the opposite tend to be true - High AT girls have parents who emphasise AInT more than parents of Low AT girls ($t = 1.85$, $p = 0.07$). Here again we have the paradox of high AT girls who have parents less supportive of ambiguity tolerance in their child!

The connection between AT scores from MAT-50/BG-3 and AInT Encouragement is again confirmed. This is probably due to the fact that most of the items in the questionnaire MAT-50 describe ambiguity intolerance, i.e. the high AT score on this test means a systematic rejection by a given individual of the different reactions of intolerance to ambiguous situations, events and ideas. The high AT individual, on the basis of this test, is the one who says in fact " I am not intolerant of ambiguity". This fact is a strong content-validating finding with respect to both the test and PTATS scales.



NB. Greater encouragement / importance is indicated by a lower score.

Figure 4.2. Parents' AInT Encouragement in High and Low AT students in different types of settlement



NB. Greater encouragement / importance is indicated by a lower score.

Figure 4.3. Differences in parents' AInT Encouragement between boys and girls with High and Low ambiguity tolerance

Discussion

It is always very difficult to draw implications about the development of a personality disposition from cross sectional data. When testing is done in a single point in time and it is not possible to evaluate cohort-based differences, it is even more difficult. Despite the limitations of the cross sectional design in the developmental study of personality, it provides large set of empirical data and helps identify the relevant individual factors and contextual influences. The results obtained in the study of the development of ambiguity tolerance in adolescents will be summarised in line with these considerations.

One more important methodological point needs to be mentioned. When the individual differences in ambiguity tolerance measured with the Bulgarian adaptation of MAT - 50 (Norton, 1975) are concerned, the results we have can be treated as reliable and representative for the Bulgarian adolescent population. The internal consistency of the scale and the row scores distribution have been cross-validated on two different samples with more than 1,000 subjects. The stability of the scores over time has been estimated as well and proved to be very high. The main effects of gender, age and educational setting have been re-confirmed as well. Bulgarian data compare to what has been reported in the psychological literature about ambiguity tolerance as a personality trait as well as to the very scarce results available on ambiguity tolerance in adolescents.

The situation is rather different when PTATS is considered. This is an original instrument, created purposely for this study and it has no analogue in the psychological literature. No research data are available to compare our results with. The data gathered in our study give support to PTATS validity in a very promising way, but nevertheless findings about At - AInT encouragement will be treated in the subsequent analyses with much more caution.

By the age of 15, ambiguity tolerance is already a rather stable personality characteristic and does not change with the age in the next ten years of life. The development of ambiguity tolerance as a personality disposition goes in line with the adoption of appropriate values and beliefs. High school students in Bulgaria value ambiguity tolerance more than ambiguity intolerance which is also accepted. Although preferring situations with clear chances for success, they think it is important to test themselves by taking risks, experimenting in different situations and participating in new endeavours. Unexpected situations and surprises are enjoyable, but it is also important to be on the safe side and to build up a definite opinion about things in life. Boys and girls don't differ in their reactions to novel, complex, contradictory or

incongruent information, but high school students in the small experience more difficulties in adapting to encounters with ambiguous situations, ideas and events.

Being ambiguity tolerant help adolescents to better handle cognitive and emotional complexity, facilitate their personality growth and social integration. High ambiguity tolerant adolescents score higher on intelligence, generate more original solutions to open-ended verbal problems, give more creative titles to pictures and perform better on an anagram test (MacDonald, 1970). Raphael, Moss and Cross (1978) report a significant correlation between high school females' scores on ambiguity tolerance and intelligence. They suggest that, if tolerance of ambiguity viewed as a component of individual's repertoire of coping skills, intelligence would provide an important contribution to such skills. Ambiguity tolerance helps having more positive self-image and better social relationships: high ambiguity tolerant students see their relations with the peers and the parents as more favourable. On the other hand, low ambiguity tolerant students are more anxious and feel more uncomfortable with themselves and with their psychic life.

What makes the differences in ambiguity tolerance? The definition of ambiguity tolerance - intolerance implies that "both environmental demands and the individual's coping resources will affect it" (Budner, 1978, 638). Our results have shown that temperament is not a significantly differentiating factor among high and low ambiguity tolerance. The positive self-image and capacity for cognitively complex processing of information seem be relevant to building up individual resources in coping with uncertainty.

What effect have school and home on adolescents' abilities to cope with uncertainty? Adolescents perceive both their teachers and parents as being encouraging ambiguity intolerance more than ambiguity tolerance. Students also perceive adults as being more intolerant of ambiguity than they are themselves, especially teachers. Is this perception biased by the specific developmental situation in adolescence ? Might be, it is difficult to give a clear answer on the basis of our data only. In any case, adults themselves quite don't agree with this picture.

Teachers both in the capital and outside of it report encouraging the exploration of ambiguity more than certainty seeking. Female teachers encourage ambiguity tolerant behaviours in their students more than male teachers do. This effect is mainly due to women's support for non-traditional vocational and aesthetic interests. There is some tendency for older teachers and those with more years of teaching experience to be more restrictive and certainty oriented in their reward strategies than younger ones. Nevertheless, teachers' encouragement for ambiguity tolerance is the highest one obtained in our study. Their professional status may have contributed to a

better understanding of what promotes adolescent's development in school and successful adaptation to the working and social life afterwards.

Parents, mothers as well as fathers, younger or older, are those who most strongly support certainty oriented behaviours and show least encouragement for getting involved with new, unknown and uncertain situations. Parents with higher education and living in the capital are less bound to risk avoiding preferences than those from the small town and with secondary education. Coleman (1993) reports evidence that parents of adolescence report this stage to be the most problematic and anxiety provoking of all the stages of parenthood. Might this be an explanation for their ambiguity intolerance? A study of ambiguity tolerance with larger sample of parents having children at different ages could give some answers to this question. The very unstable situation in our country during the last years and all concomitant problems might have contributed to the building up of parents' opinion aas well.

To what extent evaluative standards at school and at home influence ambiguity tolerance in adolescents? The degree of encouragement parents report for ambiguity tolerance - intolerance is slightly related to how important students perceive these values to be for themselves. This relation is recognised and accepted by students who perceive their parents' encouragement or discouragement for ambiguity tolerance to be similar to their own judgements. This is not the case however when teachers' reward strategies are concerned. More students assign importance to ambiguity tolerant behaviours more they see their teachers emphasising intolerant behaviours. It seems like students adopt values similar to those of their parents but in opposition to their teachers' perceived expectations.

Also, high ambiguity tolerant students perceive their teachers as being encouraging both ambiguity tolerance and intolerance more than low ambiguity tolerant students do. What might the explanation be? Is this a generalised adolescents' perception of evaluative pressures coming from their teachers? A study by Chabassol and Thomas (1975) suggest it might be due, in fact, to ambiguity tolerance itself: they have found significant and negative correlation between students AT scores and their needs for structure, i.e. guidance, advice, information, clarity or direction offered by an adult figure of authority.

Or, are teachers unable to identify ambiguity tolerance as it manifests itself in adolescent's behaviour and therefore unable to offer them the support they believe should be given them? This is a point that hadn't been examined in our study. Tatzel (1980) found that six months after students enrolled in the college, faculty were able to evaluate them on characteristics associated with ambiguity tolerance (e.g. need for structure, openness to new ideas). The correlation of faculty evaluations and students'

scores on Budner's scale was 0.45 ($p<0.01$), suggesting that this a dimension faculty are sensitive to (11 faculty and 24 students).

As to ambiguity tolerance as a personality disposition, students' ambiguity tolerance seems being unrelated to parents' reward strategies. Although boys and girls don't differ in their ambiguity tolerance, girls feel their parents encourage ambiguity intolerance more. High ambiguity tolerant girls have no support for their positive orientation toward exploring and mastering ambiguity: their parents are emphasising certainty seeking even more that the parents of low ambiguity tolerant girls. The same is true for high ambiguity tolerant adolescents in the small town. High ambiguity tolerant boys and students in the big city have parents who are most willing to accept uncertainty in their children's life.

What is the impact of education on ambiguity tolerance after adolescents leave high school and go or not to university? This choice seems being related to ambiguity tolerance: adolescents who do not study at a university level have lower ambiguity tolerance than university students. What is the cause and where is the effect is difficult to say. Ambiguity tolerance seems related to a cluster of traits and abilities that are desirable in college-level learning: some of these are openness to new ideas, exploratory orientation, cognitive complexity, the ability to analyse a text or topic along several lines of interpretation, and creativity (Tatzel, 1980). On the other hand, ambiguity tolerance helps to better adapt to a new style of life, new social group(s) and to a different, more complex learning environment.

Girls who don't go to the university tend to have lower ambiguity tolerance than boys in this situation. Comparative data are available for 90 Grade 12 girls' whose scores on ambiguity intolerance were correlated with 3-year follow-up data (Raphael and Chasen, 1980). Authors' results indicate predictive validity of AInT scores for some life outcomes: 1) working women, either working or studying, who live away from home have lower scores on AInT than subjects living at home, but there is no significant difference related to status (working vs. being student); 2) AInT is significantly correlated ($r = -.24$ and $.21$, $p<0.05$) to socio-economic level and traditionalism of desired vocation; 3) there are no differences relating AInT to plans to integrate childrearing with employment, projected future employment status, life satisfaction or adjustment. The traditional perception of the woman's role is rejecting for many of the ambiguity tolerant behaviours. Away from the university education carrier path, girls seem being more under the pressures of the gender-role stereotypes.

There are some empirical research relating ambiguity tolerance to identity development in female adolescents. 100 high school girls were tested with Budner's AInT scale (Budner, 1962) and AInT was found to significantly relate to identity style (Raphael, 1978). Both Forseclosure and Diffusion status females are more intolerant of

ambiguity than Moratorium status females. Being aware of alternatives and willing to consider them in the areas of someone's future plans, beliefs and interests is enabled by /conducive to greater capacity to withstand uncertainty and tolerate the discomfort of an ambiguous situation.

Among university students, freshmen significantly outscore all others. Being successful in intellectual pursuit like the highly selective entrance exams and being taken in a university is a personal and social value of great importance in Bulgaria. Increased self-esteem, positive expectations about the future, unrealistic beliefs, personal goals and hopes result in both the first-year-students high scores in AT and their significant decrease during the second year in the university. Freshman enthusiasm, the stimulation of the novel situation and the self-perception of omnipotence come down when confronted with realities far away from adolescents' dreams. The normative regulation of the secondary school is changed by an educational context which emphasises self-initiating learning that require changes in the system of self-regulation as well.

Students in arts outscore those from the business and in the medical and technical universities. Do high ambiguity tolerant students prefer this field of study or the educational setting channels students' personality in that particular way? The personalised and flexible learning process, using ambiguity as a creative challenge, favours ambiguity tolerance more than the group adherence to structured anonymous knowledge in the traditional educational context.

Conclusions

This project has been a pioneering investigation of ambiguity tolerance in adolescents in Bulgaria. Very little research relating ambiguity tolerance to developmental issues has been completed elsewhere too. That is why let us first focus on the **scientific benefits** from its realisation. In terms of *enriching our knowledge about adolescence* it provides systematic data on youth's responses to uncertainty in life and factors influencing them. Extensive information has been gathered about the development of ambiguity tolerance in male and female adolescents, high school students in and outside the capital, within the context of high school and of the university, among working and studying adolescents. Parents' and teachers' reward strategies toward ambiguity tolerance were examined in relation to both adolescents' ambiguity tolerance values and ambiguity tolerant - intolerant behaviours. The obtained results have been publicised to the scientific psychological community through presentations at international scientific conferences: 8th European Conference on Developmental Psychology, 7th Biennial Meetings of the Society for Research on Adolescence, 6th Biennial Conference of the European Association for Research on Adolescence and 9th European Conference on Personality.

The research work largely contributes to *the better understanding of ambiguity tolerance as a personality variable*. The observed differentiation between ambiguity tolerance and ambiguity intolerance as both values and behavioural dispositions can become an important tool in dealing with several "hot" issues in personality research, like e.g. the inconsistent results obtained with different measures of ambiguity tolerance, the multidimensionality of the construct, etc. The study of the personality and cognitive characteristics of high and low ambiguity tolerant adolescents provided not only validity evidence for the MAT-50 questionnaire, but also a more differentiated picture of the psychological concomitants of ambiguity tolerance.

Several *methodological innovations* outgrew from the project. The obtained results characterise the Bulgarian adaptation of the MAT - 50 questionnaire as a very good psychometric instrument to assess individual differences in ambiguity tolerance. It provides valid and reliable measurement of ambiguity tolerance as a general personality trait. It is susceptible to individual differences in ambiguity tolerance related to subjects' sex, age and education as well. The construction and initial approbation of PTATS as an original instrument for assessment of parents and teachers encouragement for ambiguity tolerance - intolerance should be mention as well. The separation of ambiguity tolerant - intolerant behaviours in the construction of PTATS proved to be an effective approach since different psychological dynamics for rejecting intolerance and supporting positive models of dealing with uncertainty respectively

were found. Both future research and the work of the professional psychologists will benefit from the available large set of collected data and the questionnaire MAT-50 that has been adapted for use with Bulgarian population in the age interval 15 - 25 years.

The obtained results help delineating some *prospective areas of future research on ambiguity tolerance*. Introducing the cross cultural perspective is but one of them. The effects of the university setting on the development of ambiguity tolerance will be of great interest not only in the context of the research on adolescence but also in view of the reforms that have been undertaken in Bulgarian higher education toward its greater openness and flexibility, objective evaluation of the outcomes and self-initiated innovation in the learning process. The study of ambiguity tolerance can further clarify the interaction of cognitive and personality factors in the development of the individual, his/her creativity, interpersonal relations and social behaviour.

The **practical benefits** of this project are related to its *educational implications*. Important, although negative finding is that the potential teachers have as promoters of adolescent development is strongly undermined by the way the role of the teacher is presented to and/or perceived by students. Today Bulgarian school owes both teachers and students a more co-operative and open learning environment.

The UN Convention on the Rights of the Child states that education should be directed to full and harmonious development of child's personality and abilities, to preparation of the child for an individual and responsible life in a free society. The secondary school, more than any other educational setting, may contribute to the realisation of these goals and help children grow in this complex and rapidly changing world. The obtained results help educators to find better answers to the questions: How to identify and stimulate dispositions and skills related to ambiguity tolerance in students? What is the best way to cultivate ambiguity tolerance in boys compared to girls? Which personality characteristics to reward in order to develop positive reactions toward ambiguity? The project and its outcomes bring attention to the problems school faces and to the potential it has to empower young people in their exploration of novel, challenging and complex situations.

References

Adams, G. R. and Fitch, S. A (1983) Psychological environments of university departments: Effects on college students' identity status and ego stage development, Journal of Personality and Social Psychology, 44(6), 1266-1275.

Budner, S. (1962) Intolerance of ambiguity as a personality variable, Journal of Personality, 30, 29-50.

Budner, S. (1978) Intolerance of ambiguity and need for closure, Psychological Reports, 43(2), 638.

Chabassol, D. J. and Thomas, D. (1975) Need for structure, tolerance of ambiguity and dogmatism in adolescents, Psychological Reports, 37(2), 507-510 .

Coleman, J. (1993) Adolescence in a changing world, in: Jackson, S. and Rodriguez-Tome, H. (Eds.) Adolescence and its social worlds (pp.251-268). Hillsdale, NJ: Erlbaum.

Frenkel-Brunswik, E. (1949) Intolerance of ambiguity as an emotional and perceptual personality variable, Journal of Personality, 18, 108-143.

Eysenck, S.; Paspalanov, I. and Stetinski, D. (1984) Bulgarian adaptation of the personality questionnaire of H. Eysenck, Bulgarian Journal of Psychology, 1984, 5, pp.79-93 (in Bulgarian).

Jackson, S. and Rodriguez-Tome, H. (Eds.) (1993) Adolescence and its social worlds. Hillsdale, NJ: Erlbaum.

Jonassen, D. H. and Grabowski, B. L. (1993) Handbook of Individual Differences, Learning and Instruction, Hillsdale, NJ: Erlbaum.

MacDonald, A.P. (1970) Revised scale for ambiguity tolerance: Reliability and validity, Psychological reports, 26, 791-798.

Norton, R. (1975) Measurement of ambiguity tolerance, Journal of Personality Assessment, 39, 607-619

Offer, D.; Ostrov, E. and K. I. Howard (1981) The Adolescent: A Psychological Self-Portait. New York: Basic Books

Raphael, D. (1978) Identity status in high school females, Adolescence, 13(52), 627-41.

Rapahel, D.; Moss, S. and Cross, W. (1978) Budner's intolerance of ambiguity: A note concerning intelligence, Psychological Reports, 43(2), 624-626.

Raphael, D. and Chasen, M. M. (1980) Intolerance of ambiguity and life status during early adulthood: A three-year follow-up, Psychological Reports, 47(2), 388-390.

Paspalanov, I. and Stetinski, D. (1988) Construction and standardisation of a Bulgarian scale for measuring nAch, Annual Review of University of Sofia, 1988, 78, pp.29-55 (in Bulgarian).

Paspalanova, E. and Stetinski, D. (1985) Bulgarian standardisation off the culture-free intelligence test C.F.2A, Bulgarian Journal of Psychology, 1985, 5, pp. 12-22 (in Bulgarian).

Stetinski, D. and Paspalanov, I. (1989) Norms Technical Manual for STAY, Form Y , 1989, Sofia: National Programme for Studying Human Potentialities (in Bulgarian).

Stoycheva, K. (1988) Manual for administration and scoring of the TTCT, Verbal Form A, Sofia: National Programme for Studying Human Potentialities (in Bulgarian).

Stoycheva, K. (1990) Manual for administration and scoring of the TTCT, Figural Form B, Sofia: National Programme for Studying Human Potentialities (in Bulgarian).

Stoycheva, K. and Zhelyazkova, Zh. (1992) Self-concept and need for achievement in students with creative achievements, Bulgarian Journal of Psychology, 2, 3-9 (in Bulgarian).

Sylguidjan, H. (in press) Self-Concept and Psychosocial Identity in Life Transition to Maturity, Sofia: University of Sofia Press (in Bulgarian).

Tatzel, M. (1980) Tolerance for ambiguity in adult college students, Psychological Reports, 47(2), 377-378.

Ambiguity Tolerance: Adolescents' Responses to Uncertainty in Life

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This research project investigates the personality dimension of tolerance of ambiguity from a developmental perspective. In *the first study* a questionnaire for measuring ambiguity tolerance, adapted for use with Bulgarian population, was administered to 392 high school children in Sofia and outside the capital, 472 university students and 116 18 - 25 year old working adolescents. *The second study* contrasted two groups of high-school students, identified as low (n = 51) and high (n = 55) ambiguity tolerant on the basis of their test scores in the first study. They were compared with respect to their intelligence, creative thinking abilities, temperament, anxiety, need for achievement and self-concept. *The third study* involved 303 high school students from Sofia and outside the capital, their teachers (n = 52) and parents (n= 236). An original psychological instrument has been designed and used to assess adults' reward strategies toward ambiguity tolerant - intolerant behaviour in adolescents.

The cross-sectional analysis of ambiguity tolerance in the age interval 15 - 25 years revealed no gender and age differences in its development but significant effects of education. High school students in the small town experience more difficulties in adapting to encounters with ambiguous situations, events and ideas. Girls who don't go to the university score lower than both university students and working male adolescents. Among university students, freshmen significantly outscore all others. Students in arts have higher ambiguity tolerance than those in the medical and technical universities and different patterns of age-related differences in ambiguity tolerance were found among them.

Being ambiguity tolerant allows adolescents to better handle cognitive and emotional complexity, facilitate their personality growth and social integration. High ambiguity tolerant adolescents score higher on intelligence and lower on anxiety, generate more original solutions to open-ended verbal problems and more creative titles to pictures, have positive self-image and better social relationships. Ambiguity tolerance helps to better adapt to a different life style, new social groups and more complex learning environments.

Students value ambiguity tolerance more than ambiguity intolerance and perceive adults as more intolerant than tolerant, especially teachers. Girls feel their parents encourage ambiguity tolerance more as well as the high ambiguity tolerant students in the small town do. Students' ambiguity tolerance as both a value and personality disposition is slightly related to the encouragement parents report for ambiguity tolerant - intolerant behaviours and is unrelated to teachers' reward strategies.

APPENDIX

PARENTS - TEACHERS AMBIGUITY TOLERANCE SURVEY

The review of the psychological literature on ambiguity tolerance revealed no ready-made instrument to be used for investigation of how parents and teachers influence the development of AT in adolescence. In fact, this question has not been investigated at all. Therefore, we had to design an appropriate measure within the frame of this research project. *Parents - Teachers Ambiguity Tolerance Survey (PTATS)* is an original instrument designed to assess adults' encouragement for ambiguity tolerant - intolerant behaviours in adolescents. Detailed description of the procedure of its construction follows:

Step1. A large sample of behavioural characteristics indicative or contraindicative of AT was compiled from the research literature. Then they were discussed within the expert group of the project and a list of 30 AT and 30 AInT behavioural characteristics was drawn. The 60 items were listed in an alphabetic order and were given to 30 professional psychologists and to 34 graduate students in psychology at the University of Sofia who served as experts in the evaluation of the content validity of the items. The AT Expert Checklist 2 provides also a brief description of the content of the personality construct "ambiguity tolerance" and of the characteristics of high and low ambiguity tolerant people. The experts were asked to read the descriptions and to indicate for each of the 60 items whether it describes ambiguity tolerant behaviour (AT), ambiguity intolerant behaviour (AInT) or to put ? to items they can't decide about or think they are irrelevant to ambiguity tolerance. Table 1 contains the list of the items translated in English, the type of behaviour they were designed to describe and the percentage of experts who have assigned this particular item to its presupposed content category (AT or AInT behaviour). The two group of experts were very similar in their decisions with one exception only: students identified item No 60 "Knows how to show his (her) disapproval of a certain person" as being indicative of ambiguity tolerance significantly more often than professional psychologists did.

Out of the initial 60 items, 23 AT and 11 AInT items were selected, the general rule being to keep items that have been correctly identified by 80% of the experts. An exception is, for example, item No 46: although being quite clear indication for AT, it has been dropped since some experts pointed out that it describes more a life philosophy one

been dropped since some experts pointed out that it describes more a life philosophy one achieves or not at a moment in his/her life rather than a behaviour which can vary among individuals and situations.

Step 2. The remaining 34 items were then evaluated for social desirability by 30 teachers (13 men among them) and 48 parents (of whom 48% are fathers). All teachers and 50% of the parents are university degree holders. In the AT Expert Card 3 - Parents and AT Expert Card 3 - Teachers the formulations of some items are slightly changed to further improve their content validity - the new formulations are indicated with asterisk in Table 1. The instruction to the experts says they should: a) read the items and b) indicate the degree to which parents (teachers) should encourage or not these behaviors in their children (students) c) using the following scale: ++ (it's obligatory to be encouraged), + (should be encouraged), - - (it's obligatory to not be encouraged), - (should not be encouraged), ? (can't decide). The results are given in Table 1.

Step 3. From the 34 items, an equal number of AT and AInT indicators had to be selected which have 1) similar degree of social desirability and 2) are neither strongly rejected nor accepted in order to avoid social desirability biases later in the answers of the experimental subjects. Thus 7 AT and 7 AInT items which are thematically related and have moderately high social desirability were retained. In Table 1 these items are given in bold italics. The 14 items constitute PTATS - Parents - Teachers AT Survey that was then used on the third stage of the research work in this study.

Table 1. Items, type of behaviour they describe and scores for content validity and social desirability of the items

Items	Type of behaviour	Correctly identified by % of experts	Social desirability in % of experts				
			+ +	+	?	-	- -
1. Adapts well to the changes.	AT	98.4	15.4	80.8	2.5	1.3	0
2. When accepting someone accepts him/her entirely, when rejecting someone rejects him/her completely.	AInT	81.2	1.3	20.5	6.4	66.7	5.1
3. Quickly forms an opinion about a person or event.	AInT	54.7	-	-	-	-	-
4. ***Prefers well established aesthetic values.***	AInT	92.2	6.4	60.3	3.9	28.2	1.3
5. When in problem situation seeks a quick and concrete decision.	AInT	56.3	-	-	-	-	-
6. Is always ready to consider new arguments and different points of view.	AT	100	32	65.4	0	2.6	0
7. Always tries to find the right way of doing things in a given situation.	AInT	51.5	-	-	-	-	-
8. Refrains from exposing his/her feelings and emotions.	AInT	59.4	-	-	-	-	-
9. Talks clearly, concisely and concretely.	AInT	15.6	-	-	-	-	-
10. Acts and thinks with flexibility, according to the situation.	AT	93.8	44.9	53.8	1.3	0	0
11. Dramatises and gives an emotional connotation to the stories when retailing them.	AT	43.7	-	-	-	-	-
12. Behaves naturally without caring for the impression of his/her conduct.	AT	93.7	6.4	78.2	3.9	11.5	0
13. ***Puts to test him(her)self by experimenting in different situations.***	AT	98.4	3.9	65.4	9	21.8	0

Items	Type of behaviour	Correctly identified by % of experts	Social desirability in % of experts				
			+ +	+	?	-	- -
14. Does not harbour resentment for people even when not agreeing with their opinion	AT	81.2	24.4	68	2.1	6.4	0
15. ***Chooses situations with clear chances for success.***	AInT	90.6	5.1	53.6	5.1	35.9	0
16. Has chosen non-traditional, untypical profession 16*. ***Apt to non-traditional profession.***	AT	87.5	1.3	50	20.5	28.2	0
17. ***Avoids risks.***	AInT	96.9	0	37.2	6.4	55.1	1.3
18. Has a clear vision about him/herself, and sticks to it	AInT	50	-	-	-	-	-
19. His/her friends are people with different views and characters	AT	96.9	2.6	84.6	3.9	9	0
20. Has clear differentiation of what is good and bad	AInT	65.6	-	-	-	-	-
21. Needs to be fully informed before taking decision what to do	AInT	68.7	-	-	-	-	-
22. ***Holds definite opinion and judgements about most things.***	AInT	73.4	2.6	37.2	6.4	51.3	2.6
23. Dreams to travel and discover new unknown places	AT	89.1	19.2	68	6.4	6.4	0
24. Dreams to gain the recognition of people from his/her environment	AInT	35.9	-	-	-	-	-
25. Thinks out everything in advance and prepares him/herself for different possibilities	AInT	56.2	-	-	-	-	-
26. Does not rush to form an attitude towards the other people	AT	85.9	10.3	71.8	3.9	14.1	0

Items	Type of behaviour	Correctly identified by % of experts	Social desirability in % of experts				
			+ +	+	?	-	- -
27. Does not philosophise too much.	AInT	29.7	-	-	-	-	-
28. Is not afraid to make mistakes.	AT	98.4	10.3	75.6	3.9	9	1.3
29. Apt to contemplating about the general questions of human life and the Universe.	AT	67.2	-	-	-	-	-
30. Enjoys meeting people from different walks of life.	AT	100	9	82.1	1.3	7.7	0
31. ***Enjoys unexpected situations and surprises.***	AT	98.4	2.6	53.9	10.3	32.1	1.3
32. Thinks out different solutions in complicated situations.	AT	90.6	26.9	69.2	1.3	2.6	0
33. Associates mainly with people from his (her) circle.	AInT	93.7	2.6	43.6	9	39.7	5.1
34. Tries to grasp the whole problem and seeks the final solution.	AT	68.7	-	-	-	-	-
35. ***Puts to test his (her) abilities with complex tasks which he (she) might not succeed to solve.***	AT	98.4	1.1	73.1	1.3	11.5	0
36. He (she) has chosen a typical masculine (feminine) profession.	AInT	71.9	-	-	-	-	-
37. Challenges the norms and regulations set by the elderly.	AT	73.4	-	-	-	-	-
38. Has critical attitude towards the opinion of the authorities.	AT	78.1	7.7	66.7	2.6	20.5	2.6
39. Approaches the problems systematically, step by step.	AInT	35.9	-	-	-	-	-
40. Accepts people with both their positive and negative traits.	AT	92.2	15.4	82.1	0	1.3	1.3

Items	Type of behaviour	Correctly identified by % of experts	Social desirability in % of experts				
			+ +	+	?	-	- -
41 Sticks to a one and the same way of thinking and behaving. 41* Rarely changes his (her) way of thinking and behaving.	AInT	87.5	0	14.1	9	70.5	6.4
42 ***Prefers to be on the safe side.***	AInT	96.7	3.9	38.5	14.1	42.3	1.3
43 ***Prefers the well known certain things.***	AInT	96.9	1.3	39.7	7.7	50	1.3
44 ***Prefers situations with no strict rules and no prescribed ways of doing things.***	AT	93.7	3.9	56.4	2.6	35.9	1.3
45 Prefers situations in which the rules and ways of doing things have been clearly defined beforehand.	AInT	95.3	1.3	44.9	9	43.6	1.3
46 Has awareness that good an evil are often interwoven in life.	AT	87.5	-	-	-	-	-
47 Counts on his (her) intuition.	AT	92.2	6.4	71.8	3.9	18	0
48 Freely expresses his (her) feelings.	AT	84.4	14.1	61.5	6.4	18	0
49 ***Willing to participate in new endeavours and to take risk.***	AT	98.4	7.7	62.8	3.9	25.6	0
50 Strives to grasp the problems in depth.	AT	73.4	-	-	-	-	-
51 Tries to make good impression when first meets someone.	AInT	67.2	-	-	-	-	-
52 Tries to make distinction between good and bad people.	AInT	68.7	-	-	-	-	-
53 Tries never to hurt other people.	AInT	50	-	-	-	-	-

Items	Type of behaviour	Correctly identified by % of experts	Social desirability in % of experts				
			+ +	+	?	-	- -
54 Obliges the norms and rules set at home and at school 54* ***Strictly follows the norms and rules set at home and at school.***	AInT	67.2	9	38.5	12.8	38.5	1.3
55 Concentrates on his (her) immediate everyday tasks	AInT	60.9	-	-	-	-	-
56 ***He (she) is rather original and non-traditional in his (her) tastes and preferences.***	AT	96.8	5.1	66.7	6.4	21.8	0
57 Seeks the challenge of difficult tasks	AT	100	14.1	68	1.3	16.7	0
58 Looks for friends who share his (her) views and opinions	AInT	68.7	-	-	-	-	-
59 Respects the opinion of the authorities	AInT	60.9	-	-	-	-	-
60 Knows how to show his (her) disapproval of a certain person	AT	67.2	-	-	-	-	-